HANDBOOK OF VENEREAL INFECTIONS

BY

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To Steve

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CHAPTER I

INTRODUCTION AND LEGAL ASPECTS OF VENEREAL DISEASES

With the introduction of penicillin into the treatment of venereal diseases the number of practitioners treating these infections has increased This manual is intended to be a handbook for such practitioners, senior students, and those taking up the study of venereal diseases The book is not exhaustive but is meant to give an all-round knowledge of venereal diseases. Modern treatment is emphasized and no space is devoted to out-moded methods.

Venereal infections are a social and public health problem which will only be eradicated by public education adequate free treatment and indirect action to discourage promiscuity Improved methods of treatment now render patients non-infectious much sooner than before. In consequence the problem constituted by those who discontinue treatment before cure is achieved is not so serious as hitherto

Venereal diseases are not notifiable and no compulsion can be used to make a sufferer undergo treatment except under certain circumstances (see Defence Regulation 33b). Many people would like to see some legal restraint on the transmission of venereal diseases and compulsory notification but most practitioners believe that this would lead to concealment of infection

Venereal diseases, as far as the public health service is concerned, are gonorrhœa, syphilis and soft sore of which gonorrhœa is by far the commonest. Trichomonas infestation is usually regarded as a venereal infection and in the ports and overseas, lymphogranuloma inguinale and inguinal ulcerative granuloma may be seen and are transmitted by coitus.

Under the Matrimonial Causes Act, 1937 the courts will grant a decree of nullity if one partner to the marriage was suffering from a venereal disease in a communicable form at the time of the marriage. The petitioner

(1) Must have been unaware of the infection in the other at the time of the marriage

(2) Must institute proceedings within one year of the date of the marriage,

(3) Must not have consented to marital intercourse since the discovery of the infection in the other

Free treatment of venereal diseases under conditions of close secrecy are provided by local authorities under the Public Health (Venereal Diseases) Regulations 1916 and the Public Health Act, 1936. These regulations lay down the qualifications required of medical practitioners appointed as venereal diseases officers. In addition every County Council and County Borough has to provide facilities for the free diagnosis and treatment and the prevention of venereal diseases in their area. All practitioners are entitled to send specimens from their patients to the Council's laboratories for examination, at the cost of the authority for spirochaetes or gonococci in smears or for a Wassermann test on the blood or cerebrospinal fluid. In addition arrangements are made at special centres for the free treatment of all patients wherever they live or whatever their financial means. These clinics must not be designated as for venereal diseases and nothing must be done to distinguish the patients who attend for treatment of these diseases. Much publicity is given to these facilities by posters etcetera. The local authority must supply doctors, practising in their area and who are qualified to treat venereal diseases with *supplies of arsenicals for the treatment of syphilis* in cases in which the medical officer of an approved institution has authorised the administration of these drugs. Repayment of the cost to the local authority County Council or County Borough is now included in the block grant paid by the Ministry of Health. Any practitioner requiring help or advice in the treatment of any case of venereal disease can obtain it from the public health department of his *authority*

The establishment of these clinics has helped in the marked fall in the incidence of venereal diseases which

has occurred, especially in males. Great difficulty is experienced however in getting patients to attend after the symptoms have disappeared although they are not cured. In the ports patients can rarely stay under treatment long enough and to maintain continuous treatment arrangements have been made with hospitals and clinics in all parts of the world and lists of these places where free treatment is available are supplied to seamen in the venereal diseases clinics of the ports.

Under the Venereal Diseases Act, 1917 only a registered medical practitioner may treat any person for venereal disease for reward or give any advice, directly or indirectly on its treatment. An unqualified practitioner cannot give any advice in connection with the treatment or prevention of venereal disease.

In the clinics of the local authorities patients are usually known by a number and patients can remain completely anonymous if they wish. There is no compulsion on them to disclose their name or address. A practitioner can, however be made to disclose in court any information he may possess regarding a case. If both parties in a nullity case under the Matrimonial Causes Act request a practitioner to give a report on the condition of one of them to the solicitors for both parties he must do so.

Defence Regulation 33B

This regulation was introduced in November 1942 and is still in force. It seems likely that the powers given under it will remain in force for some time whether under defence regulations or otherwise. It provides for the compulsory treatment of cases of venereal disease who have been shown to be sources of infection and who are not voluntarily undergoing treatment.

(1) When venereal diseases practitioners receive from patients undergoing treatment for venereal disease information about the source of infection they must notify the Medical Officer of Health of the County or County Borough in which the contact stated to be the source of the infection resides on Form 1

(2) When notices have been received that two or more patients have been infected by the same person the Medical Officer of Health requires that person to submit to a medical examination

(3) If the contact is free from venereal disease a clearance certificate is given.

(4) If further examination or treatment is needed the contact is given written notice to attend and follow instructions until certified free from venereal disease in a communicable form If the patient defaults the Medical Officer of Health must be informed

(5) Failure to submit to examination or to continue to attend for treatment makes the patient liable to prosecution

The Ministry of Health requires venereal diseases officers to keep a record of the number of notifications received and has to be informed periodically of what action has been taken in connection with them

Chapter II

PENICILLIN IN RELATION TO VENEREAL DISEASES

The advent of penicillin into the treatment of the main venereal diseases, gonorrhoea and syphilis, has revolutionised the management of such cases. After the first enthusiastic reports showing that this drug was lethal to gonococci and spirochaetes attention has been increasingly devoted to defining the optimum dose required and the time for which such doses should be given. The treatment schedules in use at the present time are to some extent experimental since most of the work on penicillin in these diseases has been done in the Services where it is possible to hospitalise all patients. In civilian life and especially in the clinics, which treat the great majority of these cases ambulant treatment is usually required. In consequence the doses used and the methods of administration have had to be altered to comply with these requirements.

The early good results of penicillin in venereal diseases were not maintained in practice when penicillin became more plentiful and was used more extensively. This discrepancy in the results obtained raised fears of the production of drug resistance as was known to occur with gonococci to the sulphonamide compounds. No evidence was found for the development of such drug resistance in in vitro tests and we now know that commercial penicillin is a mixture of at least four penicillins which probably differ in the composition of their side chains. The four types of penicillin are known by the letters G, X, F and K. The relative amounts of each of these vary from one sample of penicillin to another. The various types of penicillin also differ in their in vivo and in vitro effects. Penicillin K is relatively inefficacious because it is rapidly destroyed in the body whereas the other penicillins are more resistant to destruction. Commercial penicillin which is produced by deep growth of the mould was found to contain high proportions of penicillin K due to this method of pro-

duction and thus was the cause of the decreased clinical effect. This predominance of penicillin K in commercial preparations is now adjusted and they contain mainly penicillin G which is ten times as spirochaetocidal as any of the other types.

Following this change the position of penicillin in venereal diseases has been fairly well evaluated and its use has changed radically the treatment of these diseases Until penicillin was used in syphilis the treatment of this disease had always been attended by some danger because of the toxicity of the drugs used. These dangers were much greater if the dosage was increased or the period between injections decreased in order to shorten the period of treat ment. Treatment with heavy metals normally extended over a minimum of two years and even in the Services, where patients are under discipline such courses of treat ment were only completed in fifty per cent of cases

Thus the discovery that penicillin possesses a spirochaetocidal action was received with enthusiasm since it seemed *to offer a cure of syphilis in a short period of time without* producing any dangerous toxic effects. This aim has not been realised completely but penicillin does render the patients non-infectious much sooner than can be achieved with any other form of treatment and the total period of treatment has been shortened considerably

In early syphilis, whatever the total dosage used Treponema pallidum disappears from the surface lesions in twelve hours, the lesions heal rapidly and positive serological reactions tend to become negative. If the total amount of penicillin given is small, relapse occurs These relapses show in various ways

(1) (a) The chancre fails to heal and breaks down again.

(b) The chancre heals completely reappears and is accompanied by signs of secondary syphilis.

(c) The primary lesion remains healed but secondary signs develop and the Wassermann reaction becomes positive. The relapse lesions are often small and may be unnoticed by the patient. Hence the ano-

genital region must always be inspected at routine follow-up examinations since condylomata are common in this area.

(2) Serological relapses.

In successfully treated cases a positive serum becomes negative in two to five months. Relapse is shown by the serum becoming positive again.

In cases treated with penicillin alone there is some danger of relapse. Such a relapse means, unfortunately that the patient may become infectious again whereas, in the past, inadequate treatment with heavy metals only meant that the patient was a danger to himself but not to others. The present view is that penicillin should be supported by treatment with arsenic and bismuth in order to consolidate a cure. It cannot be stated with certainty how far penicillin can replace the traditional remedies but from the respective results obtained in early syphilis it seems that a dose of 3 mega units of penicillin given over a period of seven days is therapeutically equal to twenty injections of arsenic and twenty injections of bismuth. This means that one course of penicillin is equivalent to one year's treatment with the heavy metals. In consequence treatment for such long periods as was felt to be necessary in the past are not now required and the total period of treatment is reduced from two years to around six months at the most. Although, when penicillin is used alone, treatment can be completed in 14 days the final results are not as good as those obtained when metals alone are used. On the other hand such metal chemotherapy must be maintained for at least two years and this is rarely possible since the default rate is very high. Probably this substitution of two courses of metals by penicillin will allow more schedules of treatment to be completed.

In some clinics the treatment of early syphilis is completed in six weeks, but such treatment is seen mostly in the seaports where patients will not stay under treatment for a longer period. Whenever possible it is advisable, in treating early syphilis, to spread the medicaments over a

period of six months. Very little difficulty is experienced in getting patients to attend for such a period, especially when they are told the seriousness of the infection. It must not be forgotten that, untreated one out of three syphilitics die as a result of the disease.

When penicillin was used first in the treatment of syphilis the original plan was to aim at the maintenance of relatively constant levels of the antibiotic in the blood over an arbitrary minimum period of eight days. Since penicillin is readily absorbed from the tissues after parenteral injection and is rapidly excreted by the kidneys to maintain a chemotherapeutic level in the tissues it is necessary to inject an aqueous solution at short intervals. Patients were, therefore admitted to hospital and received sixty injections, one every three hours, for a total period of seven days. The results obtained were as follow

With a total dose of 60 000 units the failure rate was 100 per cent.

With a total dose of 300 000 units the failure rate was 75 per cent

With a *total dose of* 1,200 000 *units* the *failure* rate was 15-20 per cent.

With a total dosage of 2.4 mega units the infectious relapse rate is between one and two per cent and serum tests have been negative at the end of six months in 98 per cent of seronegative primary cases and in about 70 per cent of secondary syphilitic cases It is such results as these which have determined venereologists not to rely on penicillin alone but to supplement this treatment with arsenic and bismuth As a result less than one per cent have had mucocutaneous relapses and there have been no cases of serological relapse. In addition most workers have increased the total amount of penicillin used to seven mega units given over fourteen days.

The above *treatment necessitated* the admission of patients to hospital and this is not always possible especially in civilian life In addition three hourly injections cause the patient much *inconvenience* especially at

night. Experiments were therefore carried out with daily intravenous injections and this work showed that a constant level of penicillin in the blood stream was not a necessary condition for cure. Intermittent penicillin therapy is now firmly established in the treatment of syphilis and the relapse rate is no higher than with schemes of treatment employing three hourly injections

Instead of using aqueous solutions of penicillin intermittent therapy has been combined with the use of slow release vehicles so that the effect of one injection of 0 5 mega units of penicillin is prolonged for around twenty hours. Since high penicillin blood levels are not necessary for the cure of syphilis the use of such vehicles has conserved penicillin since a great wastage occurs with large injections of an aqueous solution Suspensions of penicillin in arachis oil were used at first but such a suspension produced commercially gives difficulty in rediffusing the penicillin in the oil immediately before use. It was found that a considerable amount of shaking was required before the penicillin which had settled to the bottom of the mixture was rediffused. In consequence the penicillin is now suspended in a mixture of four to five per cent beeswax and arachis oil and contains 125,000 units per cubic centimetre The beeswax carries the penicillin with it in the form of a readily diffusible deposit of about the same density as the oil so that the penicillin readily rediffuses. Such a preparation which is now the official B P preparation Inj Penicillin oleosa gives effective blood penicillin levels persisting for twenty to twenty four hours and gives excellent clinical results.

The preparation is difficult to administer because of its viscosity The suspension has to be warmed to 37-50 C A dry syringe must be used otherwise moisture tends to make the nozzle become blocked. The syringe is also warmed the penicillin suspension well shaken and the penicillin oil wax mixture drawn up using a wide-bore needle The suspension is then injected deeply intramuscularly into the buttock with the minimum of delay Commercial penicillins are now coming on to the market

which are not so viscous and are much easier to handle. Most of these preparations are suspensions in ethyl oleate. If a wide bore needle is used such suspensions do not require warming but it is advisable to use a dry syringe and needle. With these slow release suspensions one injection per day of 500,000 units is given and a course commonly consists of fourteen injections. Herxheimer reactions are very rare and usually consist of rises in temperature following the first few injections. Recently weekly injections of 0.5 mega units of penicillin in oil wax suspension have been used. Such a method is very convenient for clinic work and so far the results have been satisfactory

Since the introduction of penicillin therapy in syphilis serological investigations have been carried out at much shorter intervals than was the custom with the old methods of treatment. This frequent testing has shown that there has been a sharp increase in the number of discrepancies between the results of the Wassermann reaction and the flocculation tests such as the Kahn in parallel tests. The Kahn is consistently positive when the Wassermann reaction is negative or doubtful. In cases of primary sore treated with penicillin the Kahn becomes positive only to revert to negative as quickly whereas the amount of developed antibody is insufficient to fix complement to a degree necessary to give a positive or even a doubtful result in the standard Wassermann reaction. Apparently the spirochaetes are killed so quickly by the penicillin that their time of action as antigen is very limited. Thus it is advisable to have a precipitation serological test done at some time during surveillance after treatment in addition to the usual Wassermann reaction.

In late syphilis the action of penicillin is as rapid and favourable as in early syphilis. Although a decade must pass before its ultimate effect can be completely evaluated it is desirable that all these cases with the exception of those with gross cardiovascular disease, should have the benefit of penicillin in addition to other forms of treatment The present position is that penicillin replaces four courses of treatment with heavy metals and the previous total of

treatment is then made up with heavy metals. Penicillin alone should not be relied upon although prolonged massive dosage and multiple courses may eventually make this possible.

In cardiovascular disease penicillin is too powerful an anti-spirochaetal substance whose rate of absorption cannot be properly controlled. In consequence it should not be used for such cases. All reports of its use in this connection have stressed the severe Herxheimer reactions which have resulted.

In the prevention of pre-natal syphilis the results using penicillin have been better than any obtained with the previous lines of treatment. A full course of penicillin is therefore given in pregnancy and after delivery courses of arsenic and bismuth are given on an "insurance basis."

In neurosyphilis penicillin produces clinical and serological results which are equal, if not superior to those obtained with arsenicals and heavy metals. Both general paresis and tabes respond well. All attempts to detect penicillin in the cerebrospinal fluid after standard intramuscular doses have failed. Although this might well mean that penicillin does not pass the blood-brain barrier there is no doubt that penicillin exerts an adequate therapeutic effect in neurosyphilis. Possibly this occurs because it is present in effective concentration in the minute perivascular spaces of the brain. The greatest effect is on the spinal fluid with rapid reduction in cell and protein content towards normal in most cases of meningovascular syphilis treated by parenteral injection. In parenchymatous neurosyphilis considerable improvement occurs in the pathological cell content and total protein of the cerebrospinal fluid of many cases as well as a slower decrease in the intensity of the serological reactions. This effect is continued for weeks or months after treatment has ceased and in asymptomatic neurosyphilis penicillin is far ahead of other methods in reducing an abnormal spinal fluid to a normal picture.

Injection directly into the cerebrospinal fluid is not advisable because reactions are very common. The mildest

reaction consists of pyrexia and generalised pain after the first intrathecal injection and a severe pleocytosis mainly polymorphonuclear occurs in the fluid. This pleocytosis persists throughout the course of intrathecal penicillin. Muscular twitchings and generalised convulsions have occurred in cases of general paresis and death from chronic penicillin encephalopathy has been reported Lesions of the cauda equina have also occurred and in tabes the first injection is often followed by pyrexia and generalised nerve root pain

Herxheimer reactions sometimes occur in the treatment of neurosyphilis but these usually consist of a pyrexial reaction following the early doses. Rarely exacerbation of symptoms and thrombosis occurs In view of this injections of bismuth are best given before using penicillin

In meningovascular syphilis there is a rapid subsidence of clinical symptoms and rapid improvement in the cerebrospinal fluid which becomes normal in two to four weeks. The Wassermann reaction decreases in intensity more slowly and may become negative in two to four months. There seems to be an actual selective action of penicillin on pathological cerebrospinal fluids or meninges since there is no parallel decrease in the serological reactions of the blood If no other treatment except penicillin is used the blood Wassermann reaction may remain positive indefinitely This observation together with the finding that relapse may occur in a cerebrospinal fluid that has become normal are arguments for following up the course of penicillin with arsenic and bismuth therapy

In parenchymatous neurosyphilis the initial effect of penicillin on both the symptomatology and cerebrospinal fluid is very good The cells and protein content of the fluid may become normal within four weeks and the Wassermann reaction negative in two months. Later the fluid may become positive again so that penicillin therapy should be combined with the usual course of fever therapy in general paresis and Tryparsamide in tabes. Another advantage to the use of penicillin in general paresis is the big improvement in the patient s general condition which

follows its use and this has made fever therapy possible in many cases in which it would have been impossible previously In neurosyphilis treated with penicillin clinical improvement can always be expected to the extent to which symptoms and signs depend on inflammation rather than on degeneration. No type of treatment can replace dead nerve cells and fibre tracts although further destruction can be prevented.

If penicillin treatment of syphilis now ranks as one of the great medical advances of the war the effect in gonorrhoea is even more striking The effect in gonorrhoea does not seem so revolutionary as it might since the sulphonamides had already stopped the necessity for tedious urethral washouts in the majority of cases. Unfortunately the sulphonamides sometimes produced severe toxic effects and also many gonococci developed drug resistance. This effect has not been encountered with penicillin and sulphonamide drug resistant cases respond readily to the exhibition of penicillin. A single injection of 0 5 gms. of streptomycin has recently been shown to be curative in gonorrhoea so that if drug resistance to penicillin does develop it seems likely that we shall soon have another effective drug

The treatment of gonorrhoea with penicillin has the following effects

(1) Treatment is completed with a single injection.

(2) There are no toxic effects.

(3) Early cure is brought about in at least 90 per cent of uncomplicated cases.

(4) Asymptomatic carrier states are not produced.

The above effects are produced by one injection of 0.2 mega units of penicillin in oil wax suspension. Alternatively one or two intramuscular injections of an aqueous solution of penicillin can be used but the clinical impression is that oil-wax suspensions give the higher cure rate. In women the cure rate is only around 80 per cent after a single injection. In such cases it is as well to combine the second

injection with oral treatment with sulphonamides. There is no doubt, however that the use of penicillin has completely revolutionised the treatment of gonorrhoea. There has been a tremendous reduction in the duration of disability and in the incidence of complications. Since the gonococcus is one of the most sensitive organisms to the action of penicillin oral therapy has been attempted. Two million units of penicillin well diluted and swallowed when the stomach is empty give comparable blood levels to those obtained by injection. There may be individual variations, *however in the levels obtained and it is wiser to rely on* injections.

Any desire to use large doses of penicillin in the treatment of gonorrhoea must be resisted. The amount of penicillin used should be the smallest possible effective dose since with larger doses there is some danger of the presence of early syphilis being masked Fever and chills occurring with the use of penicillin in gonorrhoea are strongly suggestive of additional infection with syphilis A primary sore may develop in the usual way or this may be aborted and signs of secondary syphilis in the usual or an attenuated form develop later In some cases a positive Wassermann reaction may be the only sign. Provided surveillance is prolonged for three months after infection, however there seems to be no danger of concomitant syphilitic infection being overlooked

CHAPTER III

GONORRHŒA IN THE MALE

THE PRIMARY LESION

Gonorrhœa is by far the commonest form of venereal infection in this country The disease has three stages

(1) The primary lesion—urethritis.
(2) Local complications of the primary lesion.
(3) Systemic infection.

It is due to infection with the gonococcus which is a Gram-negative bun-shaped diplococcus. In exudates the organism is largely intracellular in distribution and eosinophils are commonly present in the pus. The gonococcus is a strict parasite and is spread by direct transfer once from one host to another It can live only for a few hours outside the human body Different serological types exist but are not important clinically

Infection is acquired by sexual intercourse with an infected person. Accidental contamination is a great rarity

The infection is very persistent. The mortality is low but invalidism is high in the untreated case. The local lesion is often thought to be trifling but once definite tissue infection has occurred the disease tends to be difficult to eradicate. There are often considerable periods of freedom from toxic effects and metastatic complications may not develop for years after the primary infection has occurred.

The incubation period is between 4 and 14 days. Occasionally it is prolonged up to 12 weeks, especially in re-infection.

Factors pre-disposing to infection are

Hypospadias.

Phimosis.

Large meatal orifice.

By the time symptoms occur the organism is widely disseminated through the lower uro-genital tract.

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into one specimen glass and the remainder into a second glass. Acetic acid is added to each specimen to obviate any haze due to the presence of phosphates or carbonates. Haziness remaining in the first glass points to involvement of the anterior urethra and in the second glass to involvement of the posterior urethra. In 75 per cent of cases the posterior urethra is affected when the patient is first seen.

Differential diagnosis

A urethral discharge can be due to

(1) Infection with other organisms. Can be detected by the smears.

The urethra is very resistant to infection by most pyogenic organisms and urine heavily infected with staphylococci, B Coli and Mycobacterium Tuberculosis may be passed for months without any urethral infection resulting. On the other hand infection from the use of dirty instruments or from coitus does occur especially if the mucous membrane is abraded. The organisms most frequently concerned are

(*a*) B Coli.
Usually seen in elderly men from sexual malpraxis. The discharge is thin and seropurulent in contrast to the thick, creamy pus from infection with the gonococcus. Epididimytis is a frequent complication.

(*b*) Proteus vulgaris.
The discharge is foul and brownish white.

(*c*) Staphylococci
The discharge is yellowish white and purulent. It usually results from the presence of a calculus or foreign body in the urethra. Removal of the source of irritation is followed by rapid clearing of the discharge.

(2) Intraurethral chancre. The discharge is serous and dark ground examination reveals Treponema pallidum

(3) Trichomonas vaginalis. The specific organism is

identifiable in smears or hanging drop preparations.

(4) Non-specific urethritis. Usually a virus infection.

(5) Excessive coitus or masturbation. Discharge watery No organisms or pus cells present.

(6) Use of overstrong antiseptics in prophylaxis. History discharge mucoid.

(7) Malingering in the services. Due to butter or match heads being inserted into the urethra.

When the acute phase of the disease has passed only a little redness of the meatus may be seen. No discharge may be obtainable from the anterior urethra and prostatic massage is then necessary With the patient bent forwards the forefinger is then inserted into the rectum and the upper edge of the prostate felt for The gland is then stroked with moderate pressure from without inwards first on one side and then on the other If the patient complains bitterly either the prostate is inflamed or the pressure used is too great The specimen is collected as a bead at the meatus which should have been cleansed previously or in the urine glass which should always be held under the penis during prostatic massage. *If no specimen is obtained* in this way it may be in the urine passed immediately afterwards or a heavy thread may be present. This is transferred to a slide *with a platinum loop* dried with blotting paper applied to its edge and the thread then smeared over the slide.

In difficult cases the gonococcal fixation test of the patient s serum may be valuable. The antigen used is made from pure cultures of gonococci. The test is only positive in chronic cases where the infection has spread from the anterior urethra. Thus a positive result in a case of appar ently uncomplicated gonorrhoea indicates the possibility of an uneradicated non-draining focus.

In cases in which the clinical and microscopical findings are inconclusive gonococcal infection may be diagnosed by cultivation of the organism from the urethral secretion or *from the deposit obtained* after *centrifuging* the urine The gonococcus is difficult to grow It needs

(1) Media enriched with blood serum hydrocele fluid or egg albumen.
(2) The culture tubes warmed to 37 C before inoculation. Growth is visible in 48 hours. The colonies are round, discrete, semi-transparent discs. Later the edge becomes crenated and concentric markings become visible.

TREATMENT

Efforts must always be made to make contacts attend for examination.

General

Cure is obtained more quickly if the patient rests in bed but usually treatment has to be carried out in an ambulant patient. If so the patient must rest as much as possible and avoid exertion, especially tennis, cycling and dancing The contagious nature of the infection should be explained to the patient. Urethral discharges must not come in contact with lavatory seats or towels.

The patient must wash his hands after contact with the genitalia. Personal clothing should be soaked in 2 per cent Dettol or better still, boiled He should wear a suspensory bandage and surround the penis with gauze Soiled dressings should be burnt.

Visiting of public baths or swimming pools is forbidden, as is coitus.

Diet

Alcohol spices and mustard must be avoided. Drink large quantities of fluid.

Nursing

Hot baths or fomentations relieve the pain.

Specific Treatment

An intramuscular injection of 0.2 mega units of penicillin in oil wax suspension are given into the buttock. No special preparation or diet is needed and there are no toxic sequelae. Alternatively two intramuscular injections of an aqueous solution of penicillin can be given. One hundred thousand units are given in the morning and the same

dose repeated at night. Fever and chills occurring after the injection of penicillin are strongly suggestive of additional infection with syphilis

If the urethral discharge persists or gonococci are still demonstrable in smears or after prostatic massage the injection of penicillin should be repeated and if necessary a second time Repeat injections of penicillin can be combined with sulphonamides by mouth if felt necessary Relapse usually shows in the form of a mucoid discharge within ten days

With this method of treatment there has been a tremendous reduction in the duration of disability and in the incidence of complications. The discharge clears within twenty four hours in over 90 per cent of cases and no gonococci can be found in smears In cases of failure with penicillin sulphonamides are given Sulphadiazine or sulphathiazole are best used for ambulant patients. Two grams are given immediately followed by one gram four times a day for three days The tablets may be swallowed whole or crushed and suspended in water Nausea or vomiting may occur but other toxic effects are rare. If the infection persists another sulphonamide compound is tried in the same dosage.

Drug resistance is common with the sulphonamides when these are the first drugs of choice. Penicillin is successful in these drug resistant cases and so far drug resistance has not been found to occur with penicillin

Antiseptic irrigations

When the patient does not respond to repeated courses of penicillin and different sulphonamides daily irrigations are required. Irrigation must not be attempted during the acute stage of gonorrhoea since this increases the danger of spread of the infection

Apparatus required

(1) Quart douche can or irrigator two feet above level of urinary meatus.

(2) Six feet of rubber tubing with a glass or metal urethral nozzle having a rounded blunt end The

nozzle is sterilised by boiling and stored in biniodide solution

(3) The irrigating lotion potassium permanganate 1 10,000 should be heated to 115 F

The patient empties his bladder cleans the meatus, inserts the nozzle into the meatus and allows the fluid to flow into the urethra. When the urethra feels distended he stops the flow by squeezing the rubber tubing between the thumb and the palm of the hand, removes the nozzle and allows the fluid to flow out of the urethra. This is repeated ten times.

After this he fills the urethra again and strains as if starting to micturate. This allows the vesical sphincter to relax and the lotion flows into the bladder When the bladder feels full the flow is stopped the nozzle removed and the patient micturates. This procedure is repeated thrice.

Gonococcal vaccines are used in addition to irrigation. A stock vaccine of gonococci and secondary organisms is used. An initial dose of 5 000 million organisms is injected intramuscularly and this is increased twice weekly until 50,000 million organisms are being given. This dose is continued for four injections.

Failure of treatment may be due to

Excessive use of alcohol.

Strenuous exertion.

The presence of deep seated foci of infection in Littré s glands, submucous tissues, prostate and seminal vesicles.

CRITERIA OF CURE

These tests are carried out one week after the suspension of treatment and in the absence of any clinical symptoms or signs.

(1) The early morning urine and urine which has been held for at least four hours should be examined for heavy threads.

(2) An attempt is made to obtain discharge at the meatus. Both discharge and threads are smeared and stained for gonococci.

(3) Smears are made of any prostatic secretion obtainable.

If no evidence of persisting infection is obtained

(4) Fill the anterior urethra with a 1 in 6 dilution of Lugol's iodine. This may provoke a discharge by the next day which should be examined for gonococci.

These tests should be repeated each week for one month and then monthly for two months. The anterior urethra should then be examined with a urethroscope and a full sized metal sound passed into the bladder. At each examination signs of syphilis should be searched for and at the last examination a blood Wassermann reaction is done to exclude the possibility of concomitant syphilis having been acquired.

Complications of the Primary Lesion

Accompanying the acute phase of gonorrhœa local complications may occur. Some of these are not truly complications but are part and parcel of the invasion of the mucous membrane of the urogenital tract. They comprise

(1) *Balano-posthitis*

A superficial inflammation of the glans and the inner surface of the prepuce occurs in those with a long foreskin due to the retention of secretion. If the opening in the prepuce is already small phimosis may develop. The condition clears with local cleansing.

(2) *Prostatitis*

If the posterior urethra is involved in the acute stage of the disease the prostate practically never escapes infection. The gonococci penetrate into the prostatic ducts and cause a mild catarrhal inflammation which dams back the secretion in the glands. At this stage there are no symptoms but the prostate is felt to be tender, enlarged and nodular. Prostatic massage produces heavy threads which are in the urine passed after the massage has been performed. Gonococci are demonstrable in these threads if they are stained.

The inflammation may stop at this stage or progress to

suppuration in the gland spaces. This causes pain and discomfort in the perineum and increased frequency of micturition. When the pus breaks through the gland walls a prostatic abscess develops. At this stage there is

- Severe pain in perineum and rectum especially on defaecation.
- Further frequency of micturition.
- Fever
- Later urinary obstruction supervenes and there may be complete retention.
- On palpation the prostate is very tender and tense. Fluctuation may be present. The perineum is red and swollen.

TREATMENT

The patient must be in bed on a fluid diet. Hot baths and hot applications to the perineum relieve the pain. Retention is relieved by suprapubic aspiration or the passage of a rubber catheter if hot baths and sedatives do not produce the desired result.

Systemic penicillin is given intramuscularly 20,000 units every three hours in aqueous solution, or sulphonamides starting with two grams followed by one gram every four hours. Treatment is continued until the condition has cleared and the temperature returned to normal. If an abscess points into the rectum it must be opened promptly This may be accomplished by passing a metal sound or catheter which evacuates the pus into the urethra or by incision of the prostate through a urethroscope. In other cases it may be advisable to approach the gland through the perineum and drain the abscess by this route. The abscess must not be allowed to burst into the rectum because of the danger of secondary infection and the risk of a fistula developing

In chronic infection of the prostate massage is carried out daily and the urethra irrigated immediately afterwards.

Complications of the primary lesion in the male are due to the infection causing blockage of the ducts of the various glands opening into the urinary system Such an

epithelial cells begin to appear The urine loses its turbidity but contains threads and strands which may float or sink to the bottom of the glass if they are composed chiefly of pus cells. This stage may be accompanied by a variety of symptoms

(1) Increased sexual desire.
(2) Frequent erections.
(3) Frequency of micturition.
(4) Discomfort in the perineum.
(5) General ill-health with vague aches and pains.

On examination there may be some redness at the meatus and some local irritation. A clear discharge can be expressed from the urethra and in this gonococci can be detected when smears are stained. Small cysts may be palpable along the course of the urethra. The prostate is hard enlarged and nodular Often only one lobe is affected. The seminal vesicles are palpable showing that they are also involved. Massage expresses long threads of mucopus from the ducts and these can be recovered from the urine passed after the massage has been done

As a result of the chronic inflammation the submucous tissues of the urethra become infiltrated with round cells and this is followed by the laying down of new connective tissue in the deeper tissues of the corpus spongiosum This gradually becomes converted into scar tissue and the subsequent contraction may lead to a urethral stricture. This stricture may take varying forms depending upon the situation and depth of the preceding inflammation. Thus the stricture may be linear annular or tortuous. The urethra dilates behind the stricture and the resulting retention *of urine causes chronic irritation of the mucosa* This irritation is responsible for the chronic gleet which occurs in stricture. Rarely if ulceration develops, a urinary fistula results. The bladder also hypertrophies and dilates and hydronephrosis may also develop

TREATMENT

The general measures are the same as for acute gonorrhœa The infectivity of the condition must be

stressed. Penicillin 0.2 mega units are given combined with sulphadiazine or sulphathiazole 2 grams statim followed by 1 gram every four hours for three days.

Regular prostatic massage, given daily for a week and then weekly for a month is valuable in addition. Large cold sounds should be passed in obstinate cases and are of much benefit if a small stricture is present. In resistant cases fever therapy is valuable. This can be given by means of a fever cabinet. Eight hours exposure at a temperature of 106 F are sufficient. Alternatively fever can be produced by the injection of T.A.B. vaccine. Injections are given at intervals of seven days. Fifty million organisms are given on the first occasion the dose being doubled at each subsequent injection. Owing to the exhaustion produced a course should not consist of more than six injections.

Strictures are treated as follows

(1) *Permeable and passable stricture*

Intermittent dilatation by the passage of graduated sounds or the passage of a urethral dilator such as Kohlman s, which can be expanded in the stricture is performed. No undue violence must be employed. The dilatation is carried out twice weekly for six weeks and then weekly for six weeks. Thereafter sounds are passed monthly for the next six months and every third month for a further two years.

(2) *Impermeable but passable stricture*

Retention is relieved by the passage of a metal catheter after sedatives, hot baths and atropine have been administered. Intermittent dilatation is then carried out as above.

(3) *Impassable and impermeable stricture*

(*a*) External urethrotomy is employed as in Wheelhouse s method by cutting down through the perineum, or

(*b*) by excising the stricture and suturing the urethra around a rubber catheter

Chapter IV

GONORRHŒA IN THE FEMALE

THE PRIMARY LESION

The primary lesion in the female is situated in the urethra and cervix. The detection of gonorrhœa in the female is notoriously difficult since the symptoms and signs may be trivial. A full gynaecological and obstetrical history should be taken since symptoms may be due to the presence of gynaecological disorders such as uterine prolapse, polypi, cervical erosions etc.

Symptoms

Are absent in a high proportion of cases.

General ill health is common.

Frequency of micturition.

Vaginal discharge + or − pruritus vulvae

Ophthalmia neonatorum may point to a symptomless infection of the mother

Examination

This is carried out with the woman in the lithotomy position. The lower abdomen pubic area and inguinal glands are palpated. The vulva is inspected for signs of inflammation and discharge. A finger is then inserted into the vagina and the urethra stripped from above downwards. A smear is made of any secretion obtained. A bimanual examination of the pelvis is then carried out and any abnormality of the adnexa noted. Finally a speculum is inserted into the vagina, the cervix exposed and smears taken from the cervical canal. If the history and clinical signs of mild inflammation of the genital tract are suspicious of gonococcal infection but the smears are negative the cervix is cleaned and provocative painting with 1 per cent silver nitrate carried out. Smears are taken of the cervical secretion the next day. If these are negative further

smears should be taken immediately after the next menstrual period.

In suspicious cases cultures may be necessary to demonstrate the presence of gonococci. For complete ex clusion of gonococcal infection observation for a period of three months may be necessary

Differential diagnosis.

(1) Trichomonas vaginitis—specific organism found.

(2) Leucorrhoea due to anaemia overwork, prolonged standing or to cervical erosion.

(3) Vaginal thrush—white patches present on vaginal wall. Oidium albicans easily demonstrable in smears

TREATMENT

General Nursing, Specific, are the same as for the male.

Specific treatment is not as successful in the female as in the male and local treatment is required more often to clear up a persistent discharge or erosion.

Local treatment.

This is best carried out in the form of dry toilet of the genitalia. The vulva is wiped dry and local antiseptics applied along the length of the urethra by means of cotton wool on fine probes. A vaginal speculum is then inserted, any secretion present mopped up and antiseptics applied along the cervical canal with probes. Suitable antiseptics are

2 per cent mercurochrome.

1 per cent silver nitrate.

1 per cent picric acid.

Finally the vaginal vault and walls are heavily insufflated with a silver proteinate powder as the speculum is withdrawn. Such treatment is carried out daily for as long as required.

For a persistent erosion or subacute cervicitis applications of 10 per cent picric acid are required and linear diathermic cauterisation may be necessary for final cure

Criteria of Cure

A week after suspension of treatment specimens taken from the urethra and cervical canal should be examined in stained smear and culture. In addition the orifices of Bartholin's ducts and the para-urethral ducts should be examined and smears made of any secretion obtained from them.

Such an examination is repeated each week for a month and then monthly for three months. At the final examination provocative painting of the urethra and cervical canal is done with 1 per cent silver nitrate solution followed by the examination of smears the next day. A specimen of blood is also taken for a Wassermann reaction.

Wet toilet

Local treatment by the wet method is preferred by some practitioners. The vulva is cleansed and the urethra and bladder are then irrigated as in the male with a douche can and blunt-ended nozzle using potassium permanganate 1: 10,000 heated to 115 F. A speculum is then inserted into the vagina and the vaginal epithelium cleansed with swabs. After this the cervical canal is washed out through a back flow irrigator using the same lotion as for the urethra. The vagina is mopped dry and a gauze pack soaked in 5 per cent icthyol and glycerine inserted. Such treatment is carried out daily at first and reduced in frequency as improvement occurs.

COMPLICATIONS OF THE PRIMARY LESION

These comprise

- Bartholinitis
- Salpingitis
- Proctitis

Bartholinitis

Infection of the duct of Bartholin's glands is common and its orifice readily becomes blocked by inflammatory oedema. A tender fluctuating swelling forms in the

posterior part of the labium majus and the opening of the duct can be seen as a bright red spot.

Treatment is by systemic penicillin. Occasionally aspiration of the inflammatory mass with the local injection of penicillin may be necessary and rarely incision is required.

Salpingitis.

This is the most serious complication in the female and may be combined with pelvic peritonitis.

Symptoms comprise

Lower abdominal pain,
Malaise,
Vomiting,
High temperature,
Vaginal discharge
Metrorrhagia

Tenderness and rigidity are present over the lower abdomen and there is an ill-defined tenderness in the fornices on vaginal examination. If a pelvic abscess forms a mass becomes palpable over the pubes. Fluid may form in the pouch of Douglas and, if heavily infected, a pelvic abscess develops with a concomitant increase in the patient's general symptoms.

TREATMENT

The focus of infection is limited to the pelvis by adhesions which form around the brim. Also the pelvic peritoneum seems to be more resistant to infection than is the peritoneum in the upper part of the abdominal cavity. In consequence operation is not called for in the early stages. Such an operation, involving as it does the separation of friable coils of intestine and the removal of an acutely inflamed salpinx with the patient in the Trendelenberg position, carries with it a great risk of causing general peritonitis. The only time that operation in the early stages is justifiable is when differentiation from acute appendicitis is impossible.

General

The patient is nursed in the Fowler position and hot fomentations applied to the lower abdomen. Hot vaginal douches are given frequently or preferably Elliot's continuous flow douche is used This acts as an internal hot fomentation and also washes away any discharge which may be present. If pain persists aspirin or tab codeine co B P C are given as required.

Specific

Water soluble penicillin is administered systemically 20,000 units intramuscularly every three hours until symptoms have been absent and the patient afebrile for two days.

Operative

If a tubo-ovarian abscess develops a laparotomy is performed and a drain inserted into the abscess

After the final tests of cure of the gonorrhœa tubal inflation is carried out to make certain that the Fallopian tubes are still patent If not, and the patient is very desirous of having children operative removal of the tubal occlusion may be possible. This operation should be deferred for one year after the salpingitis has cleared up.

Proctitis

Occurs not infrequently in adult women and genital re-infection from this source is common. Penicillin and sulphonamides are not very efficacious and it is better to start local treatment immediately Daily irrigation with 1 5,000 potassium permanganate is performed followed by the insertion of a protargol pessary In long standing infection this must be supplemented with local applications to the anal mucosa of the same antiseptics as are used for the cervix. These are applied through a proctoscope.

If a fissure-in-ano or peri-rectal abscess form these are treated surgically

CHRONIC GONORRHŒA

Chronic gonorrhœa in the female is a very intractable disease and gives rise to much ill health. Vague aches

and pains are common and low back ache causes much disability The periods are increased in the amount lost and the duration of the flow There is some vaginal discharge. On examination the urethral orifice appears normal but scanty mucoid discharge can frequently be expressed. This discharge is due to the involvement of Skene's tubules persisting as foci of infection. They fill up and intermittently discharge their contents. If the urethral meatus is opened the openings of the gland ducts are seen to be red and inflamed and pus can be made to exude from them by pressure through the anterior vaginal wall. The cervix frequently shows a chronic erosion. Nabothian follicles, if present, indicate partial healing

Gonococci are very difficult to detect in the cervical secretion at this stage of the disease and provocative painting with 1 per cent silver nitrate is essential. If the smears are negative they should be repeated immediately after the next menstrual period. In cases where the history is suspicious and the smears are negative culture for gonococci is essential. The complement fixation test is also useful as a diagnostic aid

TREATMENT

Systemic penicillin, 0 2 mega units in oil wax suspension is given daily for three days combined with sulphadiazine, two grams statim followed by one gram every four hours for three days. Following this local treatment with antiseptics applied to the persisting foci of infection may be required.

CHAPTER V

SYSTEMIC GONOCOCCAL INFECTION

Blood stream infections may occur at any stage of the disease. Rare with modern chemotherapy they are now seen mainly in neglected cases. They then occur about the third week of infection when the local discharge is tending to clear up

Septicæmia and Pyæmia

The most serious (and rarest) complication. Characterised by high fever sweats, chills headache loss of appetite and skin rashes The gonococcus is isolated on blood culture Vegetations may appear on the heart valves with the development of acute bacterial endocarditis.

In milder blood stream infections the cellular tissue planes are most commonly affected especially around the joints sole of the foot and loins so that gonococcal fasciitis with subsequent joint infection is one of the commonest complaints of the disease.

Arthritis

Infection commences as a peri-articular fibro-fasciitis. The inflammation is always extensive and serous or purulent exudates may form from which the gonococcus is recoverable. The synovial membrane is attacked secondarily It becomes spongy red and granulating and extends over the articular cartilage as a pannus. Peri-articular fibrosis is very common and leads to false ankylosis. The possibility of obtaining a movable joint is poor

The joint infection may be

(1) Monarticular—one large joint affected. Suppuration usually occurs.

(2) Polyarticular—many small joints affected secondary to peri-articular fibro-fasciitis.

The joints most commonly affected are the.

Sternoclavicular

Temperomandibular
Tarsal and carpal
Vertebral.

Distinguishing features.

(1) Onset sudden acute and painful

(2) Part affected tense hot and shiny

(3) Gradual improvement to a point where the condition is stationary with considerable residual disability

Poker back and flat foot are common developments in young adults.

Differential diagnosis.

(1) Gout—characteristic tophi present.

(2) Acute rheumatism—pain moves from joint to joint and gradually increases in severity

(3) Anaphylactic reactions.

Tenosynovitis

Occurs around the wrist and ankle. Pus formation is common. Onset is sudden and the sheaths become swollen and tender All movement is restricted. The condition has a strong tendency to become chronic and dense adhesions form in the tendon sheaths permanently restricting movement. A sympathetic sterile effusion may occur in the neighbouring joints.

Skin lesions

Comprise urticarial or erythematous lesions erythema multiforme and hyperkeratosis of palms and soles.

Rarer manifestations.

Bursitis,
Myositis,
Periostitis,
Pleurisy
Meningitis.

Treatment

General

Rest in bed.

Immobilisation of the painful part in plaster or by extension.

Specific

(1) Penicillin 15 000 units intramuscularly every 3 hours

(2) Sulpha drugs 2 grams followed by 1 gram every 4 hours

Aspiration of suppurating joints is necessary followed by the injection of penicillin solution 1,000 units per cubic centimetre. Rarely open operation is required.

Chronic cases require massage, active movements and heat Vaccine therapy is useful Wrenching of an ankylosed joint or flat foot is unwise since it may be followed by a flare-up of the condition.

CHAPTER VI

VULVOVAGINITIS AND OCULAR INFECTIONS

Vulvovaginitis is a condition found in children. There may be a complaint of vaginal discharge with burning of the vulva discomfort on walking or frequency and pain on micturition Occasionally there is little complaint and the mother brings the child up because she has found the discharge on the clothing

A vaginal discharge which may be profuse is found on examination. The vulva and introitus are reddened and possibly oedematous. There may be enlargement of the inguinal glands. The anus may be red and swollen.

In a chronic case there is a scanty discharge thin purulent or muco-purulent. Soreness and irritation of the vulva are present with injection of the mucous membrane, particularly in the clefts between the hymen and labia minora.

Vulvovaginitis may be gonococcal or non-gonococcal in origin and gonococcal cases are in the minority In the vast majority the infection is non-sexual in origin and is due to accidental infection and fomites.

Pre-disposing factors.

(1) The vulva of a child is relatively unprotected until the labia majora develop.

(2) The mucous membrane is thin and less resistant to infection than the adult.

(3) After the first few weeks of life the vaginal secretion is scanty and alkaline. With puberty the secretion increases and becomes strongly acid and bactericidal. This acid reaction explains the lower incidence of infection in young babies and girls over 10 years of age

The diagnosis is made on clinical signs and the finding of gonococci in smears and cultures.

Complications

(1) Cervicitis is common.

(2) Urethritis is usual but cystitis uncommon

(3) Endometritis salpingitis or pelvic peritonitis occur rarely

(4) Vulvovaginitis may occur concurrently with gonococcal ophthalmia but not during the first few weeks of life. Later a vaginitis in a child with ophthalmia may be overlooked.

TREATMENT

(1) Attempts are made to find the source of the infection—usually parental.

(2) *General nursing*

Care must be taken with bed-pans bath water thermometers and clothing to prevent spread of infection.

(3) *General routine*

In-patient treatment during the acute stage. The provision of some occupation such as puzzles to prevent the dangers of idle hands. Splinting of the elbows may be necessary Ultraviolet light for debilitated children.

(4) *Specific treatment*

(I) Penicillin.

Up to 2 years of age 20 000 units intramuscularly repeated twice.

Up to 5 years of age 50 000 units repeated twice.

Up to 10 years of age 100 000 units repeated twice.

After 24 hours no abnormal clinical signs are found and smears and cultures are free of pus cells and cocci in 48 hours. Very few failures are obtained with penicillin and its use has obviated the need for local treatment.

(II) *Sulphadiazine*

Up to 6 months of age 1 grain per pound body weight per day

Up to 1 year $1\frac{1}{2}$ grams per day in four hourly doses.

Up to 2 years 2 grams per day in four hourly doses.

Up to 5 years 3 grams per day in four hourly doses.

This is continued for 5 days.

(iii) *Stilboestrol.*

1 milligram by mouth each day

Treatment may be necessary for 2 months. This stimulates the appearance of glycogen in the epithelial cells lining the vagina and of lactic acid ferment in the vaginal secretion. The criterion of response is an acid reaction of the vaginal secretion.

If the above methods fail local treatment must be used. In the early stages the child sits in a bath twice daily for half an hour at a time and boracic fomentations are applied to the vulva in between the baths. Following this the vagina is irrigated with 1 per cent lactic acid solution by means of a soft rubber catheter The urethra is painted with 1 per cent mild silver proteinate B P C.

Relapses are frequent. Usually due to

(1) Re-infection from an insufficiently treated urethra or from the cervix and rectum

(2) Persistence of masturbation

(3) Bad hygienic conditions at home.

Criteria of cure

Negative test by films, cultures and gonococcal fixation test for a minimum of 4 months after cessation of treatment. The mother or a nurse should inspect the vulva daily

Non-gonococcal vulvovaginitis.

Due to

Staphylococci,

B Coli
Pneumococci,
Trichomonas vaginalis
Chicken pox
Scarlet fever
Diphtheria

Treatment is as for gonococcal cases.

OCULAR INFECTIONS

Ophthalmia Neonatorum

Ophthalmia neonatorum when due to the gonococcus, arises from infection occurring during the passage of the infant s head through the vagina. Approximately fifty per cent of cases are not due to the gonococcus. The condition can lead to impaired vision due to opacities of the cornea and permanent blindness may result. The maternal infection may be obvious or apparently trivial with few symptoms or signs

The incubation period is short and in 1 to 3 days after birth the eyelids become puffy and stick together The conjunctivae become inflamed and there is a purulent exudate Ulceration of the cornea then occurs and may be followed by sloughing perforation and destruction of the eyeball. One or both eyes may be affected

Prophylaxis

(1) Wipe the child s eyelids with sterile swabs as soon as the head is born and before the eyes are opened.
(2) Instil one drop of a fresh 1 per cent solution of silver nitrate into each conjunctival sac. This may be followed by a reactionary conjunctivitis which is unimportant.

Treatment

As [illegible] diag[illegible] has been confirmed by the detec[illegible] culture of pus from the

conjunctival sac treatment must be as energetic as possible if the condition is to be cleared and the sight saved.

General.

(1) If one eye only is affected it should be covered with a shade to prevent infection of the other eye.
(2) The baby should sleep on the affected side.
(3) Splinting is advisable to prevent rubbing of the eyes.
(4) If the cornea is involved atropine sulphate, 1 per cent, is instilled and the pupil kept widely dilated with further instillations as necessary

Specific

I. The drug of choice is penicillin in solution containing 10,000 units per cubic centimetre. Penicillin eye ointment is not suitable since it is easily extruded and the cure rate obtained with it is very low. The use of lamellae containing penicillin is also to be deprecated since they are frequently extruded from the conjunctival sac by the constant squeezing of the lids.

(1) All pus is washed out of the conjunctival sac with warm half normal saline.
(2) One drop of the penicillin solution is then instilled into the eye every minute for half an hour. Any discharge which forms is wiped away with cotton wool moistened with saline.
(3) Instil penicillin drops every 15 minutes for six occasions.
(4) Instil penicillin drops every hour for six occasions.
(5) The drops are continued every 2 hours until the eye is quite dry and for a further twelve hours after this has occurred.

This treatment is tedious but it cures the vast majority of cases. If desired massive systemic therapy can be employed. Injections of 200 000 units of penicillin in 1 cubic centimetre of sterile, pyrogen free distilled water are given every 3 hours deeply into the buttock. Four such injections are usually needed. If doubts exist as to the com-

pleteness of cure following this massive systemic therapy it can be supplemented by instillations of penicillin solution 10,000 units per cubic centimetre containing 1 per cent methyl cellulose. Such instillations are repeated at two hourly intervals for 12 hours after clinical cure.

II Sulphonamide compounds have the advantage of being easier to administer than penicillin but the results obtained are inferior These compounds are now used when it is impossible to use penicillin or when the response to penicillin is unsatisfactory Treatment is commenced with 4 grains followed by 2 grains every four hours and treatment is continued for 24 hours after clinical cure has resulted.

The eye may also be involved at any time during the course of a gonococcal venereal infection by transference of infection from the genitalia to the conjunctivae. The course of the disease is like ophthalmia neonatorum.

IRITIS

This is a metastatic condition commonly associated with arthritis. Usually unilateral. There is pain in and over the eye, misty vision and redness around the margin of the cornea. Photophobia may be present.

Treatment

(1) Local heat.

(2) Guttae atropine 1 per cent, is instilled until the pupil is fully dilated The pupil is then kept fully dilated until there have been no symptoms for one week.

(3) Systemic penicillin is given to eradicate the causal focus which is usually present in the prostate or seminal vesicles.

CHAPTER VII

SYPHILIS

Syphilis is a venereal disease caused by infection with a spirochete the Treponema pallidum This organism enters the body through the skin or mucous membrane and is widely disseminated throughout the body before a local lesion develops. The disease can mimic almost every other since every organ in the body is liable to infection and syphilis must always be borne in mind in differential diagnosis.

The Treponema pallidum is a delicate spiral filament 6 to 14 μ long with 6 to 12 coils which are small and regular The ends are pointed and tapering It can only be demonstrated in unstained preparations by dark ground illumination and this method is used in venereology The organism shows a rotatory corkscrew movement and also movements of flexion. Multiplication is by transverse binary fission.

Culture is very difficult and only occurs under anaerobic conditions in special media. The disease has been transmitted to monkeys and rabbits by inoculation into the genitalia.

The spirochetes are found in large numbers in the chancre and its exudate. They are also present in the buboes and secondary lesions. In other lesions the spirochetes are present in far less numbers and prolonged search is often necessary for their detection.

The infection is acquired through sexual intercourse but the lesion may be extragenital and accidental on the lips tongue or fingers. The course of the disease is divided into four stages as different sets of tissues develop a hyper sensitiveness which causes them to react sufficiently sharply to produce symptoms of disease.

(1) The primary chancre.

(2) The secondary lesions of skin and mucous mem-

branes starting 3 months after *infection* and lasting about 2 years.

(3) Tertiary stage—gummata of skin and destruction of deeper structures. Commences about 5 years after infection.

(4) *Quaternary* stage—meningo-vascular syphilis and neurological disorders.

The primary and secondary lesions constitute early syphilis.

From 25 to 40 per cent of syphilis is acquired without the patient noticing any lesion. This is most frequent in women and pregnancy especially seems to favour the occurrence of asymptomatic disease

Syphilitic infection conveys a marked degree of immunity which is an immunity of infection. In ordinary circumstances a syphilitic patient cannot be re-infected. Once the spirochaetes are destroyed however the immunity is lost.

Histological changes

When the spirochaetes have penetrated the surface of the body they pass into the perivascular lymphatics and from there pass to the regional lymph nodes and into the blood *stream. Wherever the spirochaete settles a granuloma is* produced composed of an accumulation of lymphocytes and plasma cells. This latter cell is the characteristic cell of syphilis. The new tissue is highly vascular unlike the lesions of tuberculosis Later the endothelium of the capillaries becomes swollen and obstruction may be produced. Fibroblasts are eventually stimulated and marked fibrosis occurs in healing In late lesions necrosis is frequent and is associated with the presence of giant cells. Such areas of necrosis are referred to as gummata.

THE PRIMARY LESION

A visible lesion appears 4 to 6 weeks after infection but the incubation period may vary between 10 and 60 days.

The primary lesion the chancre, is usually single but may be multiple. It is usually on the genitalia.

Male.

Frænum glans prepuce less commonly within the urinary meatus, on body of penis or lower abdomen in pubic region

Female

Labia minora os uteri Vagina is rarely the site of a chancre.

Extra-genital chancres are usually on the lips, tonsils or fingers.

Appearance of the chancre

First forms as a hard painless red papule which enlarges to the size of a pea and then ulcerates.

(1) Round or oval.

(2) Edge raised and indurated.

(3) Floor built up level with the edge, dull red in colour later glossy and coppery

(4) Freely movable.

(5) Induration extends some distance into tissue surrounding the chancre.

(6) Pink areola around the erosion.

(7) Painless.

The regional lymph nodes become hard and shotty but painless.

Histology

Dense accumulation of lymphocytes and plasma cells around the small vessels. Obliterative endarteritis causes the surrounding induration Fibroblasts common. Destruction of tissue is slight. Healing occurs spontaneously within a few weeks leaving a scar visible for several months.

If the chancre is situated on the prepuce or labia majora

oedema frequently occurs and the presence of the chancre is easily missed.

Differential diagnosis

Chancroid.

Ulcer edge undermined,
Irregular outline
Surface pitted
May be painful
No surrounding induration.

Herpes

Ulcers multiple, very shallow
No induration
If coalescence occurs the margin is made up of the segments of small circles.

Scabietic rash

Mound like
Not eroded
No areola
Not indurated.

At this stage the diagnosis is confirmed by detection of the organism and treatment should not be commenced until *the diagnosis is certain. Antisyphilitic treatment given* before examination diminishes the likelihood of finding the spirochaete in the exudate

Method of obtaining the material for dark-ground examination

If antiseptics have been applied to the primary sore a wet dressing of gauze soaked in sterile saline is applied for 24 to 48 hours. After this the sore is cleansed with a swab soaked in warm saline solution and the margin scraped lightly with a blunt instrument. On squeezing the base of the chancre serum exudes If this serum is blood-stained it is removed with dry gauze and the squeezing con

tinued until clear exudate is obtained. This is collected in a capillary tube and one end of the tube is then sealed in a flame.

When the primary sore is in the process of healing microscopic examination of the exudate may be negative. A positive result can then often be obtained by gland puncture. A large bore needle attached to a hypodermic syringe is inserted into one of the enlarged regional glands which is massaged between finger and thumb. On suction being applied a little gland fluid is then obtained in the syringe.

After about 2 weeks from the onset of the primary sore the Wassermann reaction can be employed. This reaction becomes progressively more pronounced until it is markedly positive in the second stage of the disease.

DARK GROUND MICROSCOPY

Used to make visible delicate organisms such as the Treponema pallidum which do not cause sufficient refraction of light to be visible by other means. The organism is illuminated by oblique light only and rays do not enter the barrel of the microscope unless scattered by objects of different refractive media from that in which they are suspended. The organisms appear brightly illuminated against a dark background. The examination requires

(1) A dark ground condenser

(2) A stop to reduce the aperture of the objective when an ordinary oil immersion lens is used.

(3) A bright source of light.

Condenser

The condenser is a special hemispherical one with a central stop so that only the peripheral rays of light are transmitted. These form a hollow cone the apex of which is focused on the specimen. This condenser replaces the ordinary one supplied with a microscope for usual bacteriological work. On the upper surface two rings are ground for centring purposes.

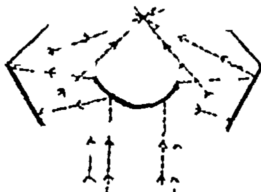


Diagram showing path of rays through condenser

Stop

This consists of a small funnel-shaped piece of vulcanite which fits into the objective behind the back lens. This reduces the numerical objective to less than 1.0

Illuminant

A ribbon filament lamp is the best consisting of a broad flat ribbon of tungsten between two stout electrodes. It works through a transformer The bulb is enclosed in a ventilated chamber with a condensing lens.

The preparation has to be as thin as possible so that the moving objects are, as far as possible, in one plane. Special slides are made so that when the cover slip is applied the preparation has a definite uniform thickness. The slide has to be around 1 millimetre thick and must be clean and completely free from grease.

Technique

A strong light is directed by the mirror on to the condenser Using a low power objective the two rings on the upper surface of the condenser are made concentric with the field.

The condenser is then racked up until it touches the under surface of the slide a thin film of oil intervening The specimen is viewed with a low power objective when

a patch of light is seen in the field. This is brought to the centre of the field by altering the mirror

The condenser is then racked down while watching the patch of light until this is at its smallest and brightest.

The objective is then changed for the oil-immersion objective a spot of oil placed on the cover-slip of the preparation and the microscope focused. If the image is hazy and ill-defined the focus of the condenser needs adjustment.

Three non-specific spirochaetes are commonly present in specimens. These are

(1) A coarse organism with few spirals.

(2) A small fat spirochaete with two or three coils.

(3) A closely coiled regular spirochaete more flexible than the above. It is twice as thick as the Treponema pallidum moves faster and has fewer coils.

Chapter VIII

SECONDARY SYPHILIS

After the appearance of the chancre there is a latent period. Then 2 to 3 months after infection the Wassermann reaction becomes positive in nearly all cases and the disease presents symptoms of a generalised infection. This stage persists for months up to a maximum of 2 years.

Main features.

(1) Headache.
(2) Fever
(3) Various skin rashes
(4) Various minor manifestations.

The main manifestation is the skin lesions. They are

(1) Symmetrical in distribution especially on flexor aspects of limbs.
(2) Coppery in colour
(3) Polymorphic—macules, papules etcetera present together
(4) Disappear without treatment.

The commonest forms are

1 *The maculo-roseolar syphilide*

Commences as a faint erythema on chest and abdomen and develops into round or oval spots which vary in size and appear to be situated in the deeper layers of the skin The rash spreads slowly over the whole body With age the colour deepens. Brownish pigmentation is left for some weeks. The rash is very faint and may be difficult to see. Recrudescences are common.

2 *The papular syphilide*

Are (I) Flat topped or
(II) Follicular

May become scaly or pustular The papules consist of raised spots bright red at first and of different sizes. Later

become dull red and finally fade to leave brown pigmented spots which persist for some time.

3. *Rupia*

Occurs about a year after the chancre and is a more severe syphilide. Individual pustules form which become covered with a dark brown scab. The underlying ulceration spreads and successive layers of crust are formed until a laminated appearance is seen. The process is a chronic one and on healing leaves circular scars with pigmented borders which persist for years. The eruption is easily confused with impetigo.

4. *The nodular syphilide*

A late manifestation often classified with the tertiary stage of syphilis. Lesions vary from 1 to 10 centimetres in diameter. The lesion consists of deeply set, brownish red nodules set in segments of circles. The nodules are skin gummata approximately 5 millimetres in diameter. The area of skin inside the circle is coppery coloured and pitted. The disease slowly advances. Found round the iliac crests, shoulders and flexor surfaces of the joints.

5. *Condylomata.*

Occur between buttocks, sides of scrotum, on the labia and upper and inner sides of the thighs. They are due to the papular syphilide occurring in warm moist areas so that the papules become prominent and wart-like with a greyish-white appearance.

Throat

In the throat small grey clear-cut ulcers form with a snail-track appearance. In addition there may be a diffuse glossitis and laryngitis.

Minor manifestations

(1) Generalised slight adenitis affecting especially the epitrochlear and cervical glands.

(2) Alopecia.

(3) Anaemia.

(4) Iritis
(5) Symmetrical subacute periostitis of long bones.
(6) Acute nephritis
(7) Acute myelitis

Differential diagnosis

All the superficial lesions of the secondary stage can be confused with any other skin disease. In syphilis, however the rash has different appearances on different parts of the body Thus it is dry on the trunk and limbs while moist papules occur on the warm parts and condylomata appear in moist areas Non-syphilitic dermatitis on the other hand always runs true to type wherever it is situated. The diagnosis is confirmed by a positive blood Wassermann reaction while a negative reaction is highly significant in a suspected case of secondary syphilis.

The Wassermann Reaction

If red cells of an animal A are injected into an animal B hæmolysins develop in the serum of B If red blood cells of A are now mixed in a test tube with serum from B hæmolysis occurs. This hæmolysis does not occur if the serum from B is first heated at 56 C for 5 minutes since this destroys the complement present in serum and this complement is necessary for hæmolysis to occur Complement is present in any fresh serum and so the addition of serum from any animal to the mixture of heated hæmolysin and red cells will cause hæmolysis.

Whenever bacteria are mixed with serum containing antibodies to the bacteria complement is fixed That the serum used contains the appropriate antibodies can be tested by adding the mixture of bacteria and serum to a hæmolytic system which has been heated to destroy complement. If hæmolysis occurs then the serum tested does not contain antibodies to the bacteria used.

This complement fixation test is the basis of the Wassermann reaction which is not a true immunity reaction but a fixation of complement by an emulsion of lipoid substances and the heated serum of an infected person. The antigen

used is an alcoholic extract of sheep heart muscle to which pure cholesterol has been added. This is mixed with the serum from 5 cubic centimetres of the patient's blood. The occurrence of complement fixation is tested by the addition of sheep's red cells plus the serum of a rabbit which has been immunised with sheep's red cells and heated to destroy its natural complement.

Each reagent used in the test must be accurately standardised and the amount of complement used be such that the weakest reaction observed can be accepted as specific. The Wassermann reaction is not only qualitative but also quantitative since results can be recorded as strongly positive (+ + +) positive (+ +) or weakly positive (+). This quantitative testing is important in assessing the results of treatment and the completeness of cure.

The reaction tends to become positive two weeks after the appearance of the primary sore and is markedly positive in the second stage. A negative reaction in a suspected case of secondary syphilis is highly significant but in latent or tertiary cases a negative result does not exclude the disease.

Positive reactions have been recorded in leprosy, yaws, relapsing fever and trypanosomiasis. Such diseases are rare however in temperate climates.

False positive reactions have also been reported in cancer, cirrhosis of the liver, infectious mononucleosis and atypical pneumonia. Thus, before accepting a positive reaction, careful inquiry must be made into the possibility of its being due to one of the above conditions.

Many physicians now combine the use of the Wassermann reaction with a flocculation test for syphilis. These tests are based on the fact that precipitation or flocculation occurs when syphilitic serum is mixed with organ extracts. Various reactions have been described: Sigma, Kahn, Meinicke, etcetera. The results obtained with these tests are very similar to those obtained with the Wassermann reaction in routine work. In syphilitics treated with penicillin, however, the flocculation reaction tends to be positive when the Wassermann reaction is negative and more posi-

tive flocculation results are obtained in early syphilis than with Wassermann's test which frequently never becomes positive.

Treatment

In early syphilis treatment aims at healing rapidly the infectious lesions and final eradication of the spirochaetes from the body by the use of penicillin and arsenic and bismuth compounds

Until the use of penicillin in syphilis the treatment of this disease had always been attended by some danger because of the toxicity of the heavy metals which were used. These dangers were much increased if the dosage was raised or the period between injections decreased in order to shorten the period of treatment. Such treatment with heavy metals extended over a minimum period of two years and was rarely completed in the majority of cases.

Penicillin has no dangerous toxic effects in early syphilis. A mild exacerbation of symptoms does occur in many cases and pyrexial reactions are common but these are relatively unimportant. In addition the advent of penicillin into the treatment of early syphilis has radically shortened the period of treatment but if reliance is placed upon this compound alone around fifteen per cent of cases relapse In consequence a course of penicillin is reinforced by courses of injections of heavy metals. In most cases this period of treatment now extends over six months. Penicillin also possesses the great advantage that it renders the patients non-infectious in a shorter time than was possible previously

The further compounds used in treatment of syphilis are compounds of arsenic bismuth mercury and iodine.

Arsenic preparations

The arsenical preparations used are organic compounds in which the arsenic is either trivalent or pentavalent. The main trivalent compound used is neo-arsphenamine B P which is sold under a variety of proprietary names It is a yellow powder containing approximately twenty per cent

of arsenic. For administration the dose, 0.15 to 0.6 grams is dissolved in 5 cubic centimetres of distilled water and injected intravenously immediately after solution. If the solution is not used soon after preparation it becomes very toxic. Neo-arsphenamine can also be given intramuscularly but is very painful when administered in this way

After a single intravenous injection neo-arsphenamine appears in the urine unchanged after ten minutes and persists for five to six hours. After this arsenic is present in the urine for some days. It is also present in the fæces in larger amounts than in the urine. After the first few minutes following injection no neo-arsphenamine is present in the blood, but an arsenic reaction is obtainable from the liver and bone marrow for around five days. Apparently the total excretion is slow and some is stored in the body and gradually released into the circulation. Pentavalent compounds are excreted more rapidly and do not seem to be fixed by the tissue cells to the same extent as the trivalent compounds.

One injection of the arsenicals kills most of the spirochaetes but a few survive and multiply In practice, therefore repeated injections of the arsenicals are given These are divided into courses of ten injections with an interval between courses so that large stores of arsenic are not built up in the body which may be released later to give rise to reactions.

The arsenical compounds have to be used with especial care and in low doses in the case of

Malnutrition,

Old and feeble patients,

Disease of the heart, great vessels or brain,

Nephritis,

Diabetes.

In the majority of cases where these conditions exist it is better not to use the arsenical compounds but rely rather on one of the other heavy metals.

M pharside is sometimes used in place of neo-arsphen-

amine. It is a trivalent compound of arsenic and is thought to be the active substance into which neo-arsphenamine is converted in the body The dose is 0.04 to 0.06 grams given intravenously

Acetylarsan is sold in ampoules of three cubic centimetres containing 0.15 grams of arsenic. Given by intramuscular injection it is of low toxicity and is used mainly in cases where intolerance to neo-arsphenamine is present.

Sulpharsphenamine B.P is a formaldehyde-bisulphite derivative of arsphenamine containing about twenty per cent of arsenic. It does not oxidise easily and can be given by intramuscular injection since it is less irritant to the tissues than neo-arsphenamine Its main use is in the treatment of children with congenital syphilis. The dose is 0.01 grams per kilogram body weight. For adults the dose is 0.1—0.6 grams.

Tryparsamide dose 1—3 grams is a pentavalent arsenic compound containing about twenty five per cent of arsenic It was first used for trypanosomiasis and is not used for early spyhilis but is reserved for neurological cases. Like all pentavalent arsenic compounds it has a liability to produce optic atrophy whereas visual disturbances are never produced by the trivalent compounds These visual disturbances with tryparsamide clear up when the drug is discontinued.

Stovarsol is the only compound for which the claim has been made that it is active when taken by mouth No great reliance is at present placed upon its use but it has to be employed when injections are not tolerated. The dose is grains 4 to 12 thrice daily

Toxic effects of arsenical compounds

When arsenical are injected intravenously there are, as a general rule no symptoms but in some cases there are reactions varying from slight inconvenience to serious disorders. Whatever compound is used they all have a tendency to damage the capillary epithelium.

Effects occurring immediat ly after injection

Faintness,

Headache,

Flushing of face

Giddiness

Nausea

General malaise,

Profuse sweating

Dyspnoea,

Restlessness

Tremor

Pain in gums and teeth,

Occasionally vomiting and diarrhoea

There may be a fall in blood pressure.

These symptoms are rarely of serious importance and are due to the too rapid injection of the arsenical. If the reactions still occur with slower injections a preliminary injection of 0.5 cubic centimetres of adrenaline 1 1,000 should be given intramuscularly some minutes before future injections of arsenicals since the reactions are of a vasomotor nature Alternatively acetylarsen, which is given by intramuscular injection can be substituted for neo-arsphenamine.

Effects occurring hours later

These are the so-called anaphylactoid symptoms. They comprise

Swelling of lips and tongue

Cyanosis

Severe dyspnoea

Urticarial eruptions

Herpes labialis,

Stomatitis,

Headache

Pyrexia.

They occur when the injection is given on a full stomach. Patients receiving arsphenamine compounds should not

have any food within two hours of the injection. The reactions do not seem to be due to a direct toxic effect of the arsenic but to an alteration in the blood proteins caused by the colloidal nature of the arsphenamine compound. They do not occur after intramuscular injection. They are arrested by an injection of adrenaline or by the previous administration of ephedrine by mouth or of benadryl.

Late effects

These are signs of intolerance and as a rule call for the termination of treatment by the injection of arsenical compounds or at least call for the greatest caution in the dosage and time between successive injections.

(1) *Albuminuria.*

Occurs following damage to the glomerular epithelium

(2) *Stomatitis*

(3) *Dermatitis*

Commences as an erythema which becomes very itchy and develops into an exfoliative dermatitis. Its incidence is dependent upon the intensity of treatment. The appearance of dermatitis contraindicates any further use of arsphenamine compounds in that case.

(4) *Jaundice*

The great majority of cases of jaundice which develop during treatment with arsenicals are believed to be ones of homologous serum jaundice caused by the transfer of a virus from one patient to another by imperfectly sterilised syringes. A freshly boiled syringe should be used for each injection. The incidence of the jaundice seems to be related also to poor feeding

(5) *Cerebral symptoms*—Arsenical encephalopathy

Its occurrence is rare with ordinary methods of treatment but is fairly frequent in patients treated by intensive methods. The syndrome usually occurs early and pregnant women are particularly susceptible. It is caused by a direct toxic action of the arsenical compounds on the brain capillaries. Severe headache and mental confusion de-

velop They are followed by the onset of epileptiform convulsions, tremor and hyper-excitability Semi-stupor may then ensue and be followed by coma and death. Immediate treatment consists of removing one-half pint of blood by venepuncture and the frequent removal of cerebrospinal fluid by lumbar puncture. Cases should be nursed in the Fowler position. In addition B.A.L. is administered (see below)

Jarish-Herxheimer reaction

Consists of a temporary intensification of the syphilitic process brought about by treatment. Is due to swelling and oedema around the local manifestations of syphilis. This may arise from the poisonous action of the proteins freed from the dead spirochaetes. Its occurrence is dangerous in aortitis and coronary obstruction since complete stenosis of the coronary arteries may be produced and subsequent ventricular fibrillation.

Bismuth compounds

Arsenical compounds work with great rapidity but their major effect works off after a few days. Bismuth also has a specific destructive effect on the spirochaete of syphilis. In consequence bismuth is given in treatment so that the immediate action of the arsenic is obtained and is reinforced by the slower and more prolonged action of the bismuth. In addition some spirochaetes may be relatively insensitive to compounds of arsenic but it is unlikely that these organisms will be resistant also to bismuth.

Bismuth compounds have no action in syphilis when taken by mouth and are too irritant for subcutaneous injection. Intravenous injections are very toxic and the drug is rapidly excreted. In consequence intramuscular injection is the only suitable method of administration in the treatment of syphilis. Sufficient treatment cannot be given at once to kill all the spirochaetes and treatment aims at maintaining the maximal concentration possible in the tissues for a long period This concentration is very near to the toxic level A variety of compounds have been tried but nowadays the main preparations used are the insoluble

compounds consisting of suspensions of bismuth metal the salicylate or the oxychloride The suspending medium may be watery or oily The British Pharmacopœial preparations Injectio Bismuthi which is a suspension of finely divided metallic bismuth in a solution of glucose and Injectio Bismuthi Salicylate which contains a suspension of bismuth salicylate in olive oil, are among the most reliable and convenient preparations which have been used. Whatever preparation is used the dose is the equivalent of 0 2 grams of bismuth metal.

Bismuth produces a chronic form of intoxication in some patients when given in the usual way in courses of ten injections The earliest symptoms are

Loss of appetite
Vomiting,
Diarrhoea
Salivation
Stomatitis

Later ulceration of the gums, tongue and mucous membranes of the mouth occurs. The urine contains albumen and casts. Bismuth frequently causes the formation of a blue line on the margin of the gums but this does not call for the termination of treatment. It is due to the presence of gingivitis and does not occur in the edentulous. Treatment must be stopped however if stomatitis or albuminuria occurs

Mercury compounds

Mercury compounds have a specific destructive effect on the spirochaete. Their value in treatment is undoubted although their position has been usurped to a great extent by bismuth especially since mercury cannot affect organisms in the central nervous system and no improvement is obtained from its use in tabes or general paresis. Its use in these forms of syphilis is to treat any other manifestations of the disease which may be present in conjunction with the neurosyphilis.

The best effect from mercury is obtained by rapid absorp-

tion and prolonged excretion Each method of administration has its advantages and disadvantages. Oral treatment is least inconvenient and Liquor Hydrarg Perchlor in thirty minim doses is the best preparation for adults. For children Pil. Hydrarg cum creta is used. The production of diarrhoea is the main disadvantage of oral therapy It is usually controlled by the addition of Tinct. Opii to the mixture. In children pulv ipecac. cum opio grains 1/12 is used.

Inunction avoids disturbance of the gastrointestinal tract. Half to one drachm of mercury ointment is rubbed in daily in different parts of the body The same area must not be used repeatedly because of the danger of irritation being produced. Treatment is continued for two weeks. Absorption is slow and the amount absorbed is unknown in any one case In addition it is a messy procedure. Subcutaneous injection is very painful but intramuscular injection is a favourite method of administration by some. The compound used is the salicylate of mercury as a ten per cent suspension in a vegetable oil. An injection of 1 cubic centimetre is given once a week. This injection is slowly absorbed and forms a depot from which mercury is gradually taken up.

Treatment with mercury is contra-indicated in cachexia and nephritis. Its toxic effects are

Stomatitis,

Nephritis,

Colitis,

Dermatitis.

Salivation appears first and as soon as this is marked the use of the drug should be abandoned.

The relative values of arsenic, bismuth and mercury are as follows. Organic arsenicals are rapid in action and are used in the early stages of the disease and bismuth is used to supplement this action. Bismuth is more rapid in its action than mercury and less liable to produce toxic effects. It is especially efficacious in late syphilis and in France bismuth has almost supplanted arsenic in the treatment

of syphilis. Mercury is now given during the intervals between courses of arsenic and bismuth. In this way toxic effects from the mercury are rare and yet advantage can be taken of its undoubted therapeutic value.

Iodine compounds

The only compound of iodine used in treatment is the potassium salt. It is used because of its power to absorb new fibrous tissue and in this way it is hoped to release any embedded spirochaetes so that they can be dealt with by the other spirochaetocidal substances administered. Potassium iodide may cause nasal catarrh and a pustular skin rash. These symptoms clear soon after stopping treatment.

Treatment of signs of intolerance

The appearance of any signs of intolerance to the heavy metals calls for immediate cessation of treatment with these compounds In the past only symptomatic treatment was possible. Thus cases of jaundice are given a high carbohydrate diet and the consumption of fats reduced. Exfoliative dermatitis is treated with such ointments and pastes as the condition of the skin at any particular time demands. In addition signs of intolerance are now treated with B.A.L. (British anti-lewisite) B.A.L. is 2.3 dimercapto-propanol. It was found as a result of planned research for the Ministry of Supply and was developed as an antidote to the local and systemic damage caused by contamination of the skin or eye with arsenical vesicant gases. In the pure state it is a colourless oil readily soluble in fat solvents and soluble to the extent of six per cent in water Its efficacy as an arsenical antidote and its power to reverse the tissue damage caused by arsenicals depend upon its ability to form relatively stable ring compounds with arsenoxides. In this way the reaction of the arsenicals with the tissues is diminished and its urinary excretion from the system is increased. B.A.L. is obtained in ampoules containing 2 cubic centimetres of a 5 per cent solution dissolved in arachil oil. The ampoules are nitrogen filled

and have been sterilised by heating for one hour at 170 C. It is given by intramuscular injection. The dosage for a normal sized adult is

Day 1—Four injections of 2 ccs. at 4 hourly intervals.

Days 2, 3 and 4—Two ccs. twice daily

Thereafter—2 ccs. are given daily as long as required.

A rise in temperature is common after the first injection. Other reactions which may occur are

Pains in arms, legs abdomen and head

Nausea and vomiting,

Lachrymation,

Perspiration.

In exfoliative dermatitis, which is the most feared of all the toxic reactions to heavy metals, the results are better than were obtained with symptomatic treatment. Healing is usually complete in 21 days. Good results have also been obtained in arsenical encephalopathy If any tendency to relapse is noted after the termination of treatment two further injections of B.A.L. are given on the first day followed by one injection on the next day

Scheme of treatment of early syphilis

The patient must be warned of the danger of infecting others. Coitus is forbidden entirely for the first three months. Following this it is permitted if a condom is worn by the male since spirochaetes can be excreted in the semen and in the cervical secretions.

Alcohol and constipation must be avoided. The teeth and gums should be examined by a dentist and whatever treatment is necessary carried out.

Specific treatment.

If the patient can be hospitalised a total of 7 mega units of penicillin are given in aqueous solution in three hourly doses of 0.125 mega units for a total period of seven days. In ambulant cases a daily injection of 0.5 mega units (4 ccs.) of penicillin in oil-wax suspension is given for 14 days.

At the end of this period the Wassermann and Kahn reactions are tested and a course of arsenic and bismuth given. Ten weekly injections of 0 2 grams bismuth metal are given together with 0.45 grams of neo-arsphenamine for the female and 0 6 grams for the male. The Wassermann reaction is now negative and the Kahn probably so. A further course of ten weekly injections of bismuth are then given by which time both serological reactions are negative If not, after a month s rest during which time mercury and potassium iodide are given by mouth, further courses of arsenic and bismuth combined and bismuth alone are given until the serological reactions are negative.

After this the patient may be regarded as provisionally cured but must be kept under observation for at least two years The blood is tested every three months for the first year and every six months in the second year The spinal fluid is tested at the end of treatment or earlier if the blood *reactions are resistant. If the fluid is normal further* examinations are unnecessary

If cases are resistant to such treatment they must be admitted to hospital for intensive treatment. Penicillin 7 mega units are given in seven days in three-hourly doses and 10 daily injections of 0 06 mapharside. Arsenical toxic effects are rare. This course is then followed by ten weekly injections of bismuth If the cerebrospinal fluid remains positive the scheme of treatment given for asymptomatic neuro-syphilis is followed

If it is necessary that the period of treatment should be shortened injections of arsenic and bismuth can be given twice weekly The dose of neo-arsphenamine is then reduced to 0.45 grams for a male and to 0 3 grams for a female Treatment spread over a longer period is more efficacious, however and only special considerations should warrant the shortened form of treatment.

Chapter IX

LATENT SYPHILIS

The early manifestations of syphilis are self-limited, clearing spontaneously as the result of poorly understood immunological reactions. Thus the highly infectious lesions on the skin and mucous membranes resolve and the disease becomes latent with no symptoms or signs. The disease has not been eradicated since autopsy examinations of such patients have revealed treponemata in various tissues usually the aorta. A chronic inflammatory process seems to follow the acute secondary stage causing atrophy of the organs and severe fibrosis. This group of latent syphilitics comprises the largest group which is encountered in practice. They are only diagnosed by the serological reactions which should be repeated at least once before a diagnosis of latent syphilis is made on this basis alone. A repetition of the blood test may show that there has been some error in the clinic or laboratory. Treatment is essential to forestall the eventual development of late manifestations of the disease. Untreated 20—30 per cent of cases develop such manifestations. Even moderate treatment reduces this to 2—5 per cent.

Treatment

Cautious treatment is necessary at the outset since it has been computed that 25 per cent of clinically latent syphilitics have aortic disease. The majority of these are cured by minimal treatment but if intensive therapy is commenced immediately there is always the risk of a severe Jarisch-Herxheimer reaction and possible death.

(1) A course of 10 injections of 0.2 grams bismuth are given and a careful watch is maintained for any praecordial pain or dyspnoea. If present a further course of bismuth is given before proceding further In its absence

(2) Penicillin 7 mega units, is given in divided doses.

(3) 10 weekly injections of neo-arsphenamine and bismuth.

(4) One month's rest.

(5) 10 weekly injections of bismuth.

(6) 10 weekly injections of arsenic and bismuth.

It is not necessary to achieve serological reversal in the blood but the cerebrospinal fluid must be normal. If not, further courses of arsenic and bismuth are necessary until this is achieved. In resistant cases malaria therapy is employed combined with injections of Tryparsamide.

CHAPTER X

LATE SYPHILIS—TERTIARY STAGE

Occurs 2 to 10 years after infection. Its duration is unlimited and recrudescences are common. The main manifestation is the formation of gummata

Skin

A firm painless swelling develops which later softens, ruptures and an ulcer develops. Ulcer has a characteristic serpiginous outline. With treatment complete absorption can occur if ulceration has not supervened. Ulcers heal with a thin tissue-paper scar which is pathognomonic. Most common on

Calves,
Shoulder blades,
Nose and face,
Flexor surfaces of joints.

Subcutaneous tissues

Rubbery lumps form and enlarge up to 10 centimetres in diameter Painless. Necrosis occurs in the centre and this necrotic material discharges through a sinus leaving a deep ulcer with a punched-out appearance. The base is covered with a tough wash-leather slough and there is a foul discharge.

Care must be taken to differentiate varicose ulceration which occurs in the lower part of the leg around the malleoli, whereas gummatous ulceration usually affects the upper part of the leg A varicose ulcer is more painful irregular and the skin around is brown and eczematous.

Tongue

Changes are diffuse.

(1) Leucoplakia—mucous membrane thickened and white.

(2) Glossitis—diffuse gummatous infiltration develops resulting in a hard, large tongue with deep fissures.

Muscles.

There may be a diffuse interstitial myositis which affects the flexor muscles predominantly Flexion of the joint is painful and if untreated the condition becomes one of permanent flexion of the joint.

A localised gumma occurs in the

Triceps,
Rectus abdominis,
Sternomastoid,
Biceps
Gastrocnemii.

The gummata are palpable as definite lumps. They may break through the skin and form typical ulcers or they may retrogress and calcify In addition the muscle may be swollen and harder than normal.

Bones

Clavicle, Sternum, Ribs, Tibia, Femur } most commonly affected

A localised gumma forms. Necrosis occurs in the centre and an ulcer may form A raised circle of ivory bone is palpable underneath. Gnawing pains are severe especially during the night when the warmth increases the local circulation.

In the skull caries occurs and perforation of the hard palate is common.

Diffuse osteitis and periostitis are more often manifestations of congenital syphilis. Sabre tibia forms.

Dactylitis

Affects the phalanges of the fingers and the metacarpals

in the feet Causes a firm painless diffuse swelling of the bone. The overlying skin is reddened to a small degree. No pain. The condition has a great tendency to spontaneous resolution leaving a permanently shortened bone Occasionally sequestra form It is distinguished from tuberculosis by the presence of other manifestations of syphilis.

Vague pains in the back in a patient with other bony lesions of syphilis should raise the possibility of spinal caries being present. The cervical vertebræ are most commonly affected.

Joints.

Most affections are manifestations of congenital syphilis. Chronic synovitis is common. Charcot joint complicates neuro-syphilis and is present in joints which are subject to stress and strain. Trauma plays a great part in the ætiology In gummatous arthritis the synovial membrane is very thickened and the joint is uniformly enlarged. There is no pain on movement and no wasting of the muscles. Small gummata are frequently palpable in the synovium.

Tendons

(1) Simple serous inflammation with effusion seen on the back of the wrist and in front of the ankle. No signs of active inflammation present. Causes disability due to the formation of adhesions inside the sheath.

(2) Gummatous teno-synovitis.
  (*a*) Diffuse thickening of the sheath.
  (*b*) Localised irregular gummata.

Bursæ

Gummatous bursitis occurs as an indolent, sharply defined tumour The pre-patellar bursa and the one over the tuber ischium are the ones usually affected.

Endocrine glands

May be affected by a diffuse gummatous interstitial infil-

(2) Glossitis—diffuse gummatous infiltration develops resulting in a hard, large tongue with deep fissures.

Muscles

There may be a diffuse interstitial myositis which affects the flexor muscles predominantly Flexion of the joint is painful and if untreated the condition becomes one of permanent flexion of the joint

A localised gumma occurs in the

- Triceps,
- Rectus abdominis,
- Sternomastoid
- Biceps
- Gastrocnemii.

The gummata are palpable as definite lumps. They may break through the skin and form typical ulcers or they may retrogress and calcify In addition the muscle may be swollen and harder than normal.

Bones

Clavicle, Sternum, Ribs, Tibia, Femur } most commonly affected.

A localised gumma forms. Necrosis occurs in the centre and an ulcer may form. A raised circle of ivory bone is palpable underneath. Gnawing pains are severe especially during the night when the warmth increases the local circulation.

In the skull caries occurs and perforation of the hard palate is common.

Diffuse osteitis and periostitis are more often manifestations of congenital syphilis. Sabre tibia" forms.

Dactylitis.

Affects the phalanges of the fingers and the metacarpals

May appear spontaneously or only on exertion. Commonly followed by angina pectoris.

Pulsation visible in suprasternal notch.

Systolic aortic murmur with second sound accentuated.

Voice becomes hoarse.

Tracheal tug present.

With aortic incompetence cardiac asthma is common. General congestion or oedema is rare.

X-ray

In aortitis the left ventricle is moderately enlarged. Aortic shadow generally enlarged, especially on right side. In incompetence the left ventricle is enlarged to the left with increased convexity of the left border of the heart and exaggerated pulsation.

Differential diagnosis

Cardiac disease occurring in middle life with no antecedent history of rheumatic fever or thyrotoxicosis is strongly suggestive of syphilis. So also is the occurrence of angina pectoris before the age of 40. The diagnosis is confirmed by finding evidence of syphilis in other parts of the body and a positive serological result. In the late stages the Wassermann reaction may be negative and the diagnosis is then reached on clinical grounds alone.

Prognosis

Unfavourable. If untreated the condition progresses. The prognosis is worse in the presence of

- Aortic incompetence,
- Involvement of the coronary arteries,
- Angina pectoris,
- Saccular aneurysm.

Saccular aneurysms

May affect ascending transverse or descending parts of the arch of the aorta. Aneurysm of the ascending arch is an aneurysm of physical signs whereas aneurysms of the other parts are ones mainly of symptoms.

Ascending arch

The symptoms of aortitis are present together with a feeling of engorgement of the face and neck, especially on stooping

Signs

Cardiac

- Face congested
- Enlarged veins on chest.
- Pulse deficient on one side.
- Pulsation or pulsatile swelling present in right second or third intercostal space.
- Systolic thrill palpable.
- Dullness on percussion on right side of sternum.
- Second aortic sound accentuated.
- Systolic murmur over pulsatile area.

Pulmonary

Pressure on right eparterial bronchus produces

- Dullness and weak air entry over right upper zone.
- Dyspnoea.
- Stridor
- Harsh cough.
- Abduction paralysis of right recurrent laryngeal nerve.

Transverse and descending arch

Symptoms are produced as a result of pressure by the aneurysm on surrounding structures.

- Dyspnoea.
- Cough and sputum
- Dysphagia.
- Pain—under sternum
  - between scapulæ.
  - round chest.
  - down arms.
- Swelling of face, neck and left arm.
- Pains in legs. Later paralysis.

Any of the signs mentioned above may be present together with

Dilatation of left pupil.

Hiccough or paralysis of left hemidiaphragm.

Bradycardia.

The diagnosis is confirmed by the demonstration of a pulsating swelling on the X-ray screen and the presence of other stigmata of syphilis. A mediastinal tumour is ruled out by the absence of cachexia.

Progress A slow increase in size occurs.

Complications.

(1) Rupture of aneurysm into pleural cavity mediastinum or oesophagus.

(2) Pressure effects Intractable pain.
Paraplegia.

TREATMENT

In late syphilis intensive treatment is not required. Eradication of the disease is not always possible and the general health is the best guide to treatment rather than serological tests. The persistence of a positive Wassermann reaction has little bearing on the ultimate prognosis. Elderly patients especially should never receive prolonged courses of treatment. The aim of treatment is to

(1) Heal lesions.

(2) Render patient non-infectious.

(3) Prevent development of further lesions.

Treatment is started with 4 weekly injections of bismuth and potassium iodide, grains 10—20 by mouth. This is then followed by a course of penicillin totalling 2.5 mega units given over a period of 7 days. Gummata and ulcers heal rapidly under this regime

If there is no impairment of liver function and no albuminuria or hæmaturia give

(1) 10 weekly injections of arsenic and bismuth.

(2) 10 weekly injections of bismuth.

(3) Mercury and potassium iodide by mouth for 4 weeks.

The above three courses are then repeated until the Wassermann reaction has either become negative or reached its lowest quantitative value. After two years treatment all arsenic and bismuth is stopped irrespective of the Wassermann reaction.

Thereafter small doses of mercury and potassium iodide are given by mouth during alternate months for the next 4 years. In this way the general health is maintained at its maximum level.

In the presence of liver insufficiency iodides and bismuth are given for 3 months. A course of penicillin is then given and followed by moderate doses, 0 3—0.45 grams, of neoarsphenamine.

With renal disease acetylarsan, 3 ccs. is used in place of neo-arsphenamine

Circulatory syphilis

Specific treatment of circulatory syphilis can only prevent extension of the lesions. It cannot restore the damage which has already been done and the healing process itself may be dangerous since fibrosis of chronically inflamed aortic valves may make them more incompetent than ever In addition a Jarish-Herxheimer reaction can cause complete occlusion of the orifices of the coronary arteries. The results of treatment are therefore limited. The earlier treatment of circulatory syphilis can be instituted the better since, once severe symptoms have developed, the most potent remedies cannot be used.

General treatment

Rest. Graduated exercises.

Adjustment of the patient s way of life to the amount of cardiac damage.

Digitalis and mersalyl for congestive failure.

Glyceryl trinitrate for angina pectoris.

Specific treatment

Used after the general measures have yielded their maximum benefit.

(1) Potassium iodide grains 10—15 t.d.s. are given by mouth for 3 months.

(2) Bismuth 0.1 grams injected weekly for 4 weeks followed by 0.2 grams weekly for 8 weeks.

Following this preparatory course, arsenicals are given provided

angina pectoris,
dyspnoeic or congestive failure,
breathlessness on mild exertion,

are absent and the patient is under 50 years of age.

Acetylarsan is used starting with a dose of 1 cubic centimetre and this dose is then gradually increased to 3 cubic centimetres and 10 injections given in all.

A second course of 10 injections of bismuth are then given with potassium iodide by mouth followed by a further course of acetylarsan. For the rest of the patient's life one course of bismuth followed by one course of acetylarsan is given each year. Where there are contraindications to treatment with arsenicals reliance is placed upon bismuth alone.

By such methods which must be arranged to each individual's requirement, the syphilitic process can be arrested or retarded. Untreated the duration of life with circulatory syphilis is around 3 years. With treatment this is prolonged to 7—10 years.

Aneurysms due to syphilis are treated on the same lines. Pressure symptoms require symptomatic treatment and peripheral aneurysms can sometimes be treated surgically rapid or gradual ligation usually being employed. Attempts to obliterate aortic aneurysms are rarely made these days.

CHAPTER XI

SYPHILIS OF THE NERVOUS SYSTEM

The nervous system is infected in 80 per cent of cases in the secondary stage of the infection. Headache irritability and mental fatigue may be present as evidence of this infection and the cerebrospinal fluid exhibits a positive Wassermann s test an increased number of lymphocytes and a raised albumen level. Sometimes the Wassermann reaction is positive in the cerebrospinal fluid before it is positive in the blood. In the majority of cases this infection of the nervous system dies out either spontaneously or as a result of treatment. In other cases the infection persists and eventually gives rise to symptoms and signs. Thus 15 per cent of cases develop meningovascular syphilis 5 per cent tabes dorsalis and 3 per cent general paresis if untreated.

The cerebrospinal fluid must always be examined in every case of early syphilis. This is usually done during the 2 years surveillance after a course of treatment has been completed. If the fluid is not normal in respect of the Wassermann reaction cells or albumen content treatment must be given until the fluid is normal. If the fluid is found to be normal no further examination is necessary since the fluid never becomes pathological later In cases of latent syphilis this examination of the cerebrospinal fluid is especially important.

In cases of neuro-syphilis the Wassermann reaction in the blood is almost always positive and the fluid always shows changes from normality in active cases. A normal fluid means that the infection has died out. Lange s colloidal gold test gives useful information when the diagnosis lies between tabes dorsalis and general paresis but in itself the test is of no value in differentiating neuro-syphilis from other diseases of the nervous system

Lange s test depends upon the precipitation of gold out of a colloidal solution of the metal by pathological cerebrospinal fluid. The test is performed by placing 5 cubic centimetres of the colloidal gold solution in a series of test tubes

and adding to each 1 cubic centimetre of progressively increasing dilutions of the cerebrospinal fluid 1/10 1/20 1/40 etcetera. The results are read 24 hours later The intensity of the reaction is determined by the degree of change in colour in the solution in each tube. Thus the normal colour is red and in order of intensity the changes are

(1) Red.
(2) Bluish red.
(3) Reddish violet.
(4) Blue.
(5) Complete decolorization.

The results are reported by giving the number of the reaction occurring in each tube. In meningovascular syphilis and meningitis the change occurs in the higher dilutions and the result reads 00001344300 In general paresis the greatest reaction occurs in the low dilutions 5555443322. In tabes the changes occur in the middle tubes 0024311000

In the central nervous system the essential lesions do not differ from those found in other parts of the body A perivascular collection of lymphocytes and plasma cells develops. This is often followed by invasion of the vessel wall with the development of endarteritis obliterans which may cause vascular thrombosis. Such thrombosis may cause an infarct and softening of the part of the brain affected The symptoms and signs of disease in the nervous system may be predominantly meningeal vascular or parenchymatous although the lesions are not limited to just one of these structures. The mode of origin of the parenchymatous lesions is not exactly known. Frequently spirochaetes cannot be found in their neighbourhood and the inflammatory lesions are often not sufficient to account for the widespread and progressive lesions.

For descriptive purposes the lesions are divided into

(1) Meningovascular lesions.
(2) Parenchymatous lesions—tabes dorsalis.
general paresis of the insane

Such a separation is not an absolute one since vascular and meningeal lesions are present to some extent in all cases. Thus the changes found in the cerebrospinal fluid in cases of parenchymal disease are due to lesions in the meninges. The parenchymatous lesions appear later than the interstitial ones but there is usually a history of earlier nervous symptoms which responded quickly to treatment. These symptoms are due to basal meningitis. The interval suggests that there has been a slow process going on which culminates in degenerative lesions of the nervous system

There is some evidence for a neurotrophic strain of spirochaetes and married partners of tabetic patients are twice as prone to develop neurosyphilis as other groups of syphilitic cases. The early lesions in those developing neurosyphilis are often less severe than in other cases and neurosyphilis is definitely less frequent in those who have severe lesions in the secondary and tertiary stages. Tabetics and paretics are not necessarily free from other manifestations of syphilis however and a careful examination must be made to exclude the presence of aortitis or gummata.

In neurosyphilis the span of life used to be only 2—2½ years. This period is now greatly extended. Complete remissions occur in 30—40 per cent and improvement in 60—70 per cent.

ASYMPTOMATIC NEUROSYPHILIS

In about 15 per cent of otherwise latent cases of syphilis the cerebrospinal fluid shows pathological changes. These findings emphasise the importance of routine cerebrospinal fluid examinations in all latent cases. The cases are divided into three groups depending upon the severity of the changes.

Type I—show minimal abnormalities The cell count and protein are slightly increased. The Wassermann reaction is negative

Type III—show maximal changes Cells and protein greatly increased. Wassermann's test positive Lange's colloidal gold test gives a paretic response

Type II—includes all cases not falling into the two types above.

Treatment

Although penicillin does not penetrate into the cerebrospinal fluid in demonstrable quantities a clinical effect is manifest on intramuscular injection. Injection directly into the cerebrospinal fluid is hazardous and should not be employed since chronic penicillin encephalopathy has followed this manœuvre.

(1) Penicillin, 7 mega units, is given spread over 14 days.

(2) Ten weekly injections of Tryparsamide, 3 grams, combined with bismuth, 0.1 gram.

(3) Oral potassium iodide and mercury for one month.

(4) Repeat course of penicillin.

Type I cases all revert to normality following this scheme of treatment. Fifty per cent of Type II also become normal. In Type III cases and those of Type II with abnormal findings still present give

(1) Ten weekly injections of bismuth 0.2 grams

(2) Ten weekly injections of Tryparsamide, 3 grams, and bismuth, 0.2 grams.

(3) Oral potassium iodide and mercury for one month.

These courses are repeated until treatment has been given for a total period of 2 years. By this time the fluid has become normal although 40 per cent of cases with Type III changes will still have a positive Wassermann reaction.

If, after 2 years treatment, the cell and protein content of the cerebrospinal fluid have not returned to normal or Lange's colloidal gold test gives a paretic response fever therapy is given as for general paresis. This is followed by courses of arsenic and bismuth until the fluid is normal in all respects except in regard to Wassermann's test.

MENINGO-VASCULAR SYPHILIS.

The lesions of meningo-vascular syphilis have an early onset and symptoms appear within 5 years of infection.

Type

Treatment

Two courses of penicillin are usually given since the improvement in the cells and protein in the cerebrospinal fluid which begins in a few days continues for 4 months. Increasing the duration of treatment and the size of the dose also improves the result.

As symptoms are due mainly to vascular thromboses early *intensive treatment must* be avoided. Even a *slight* reaction in the diseased vessels may lead to a great increase in the area of nervous tissue affected or may cause permanent destruction of nerve cells.

Scheme of treatment

(1) Oral potassium iodide grains 10—20, with Liq. Hydrarg Perchlor minims 30 t.d.s. for one month.
(2) Ten weekly injections of bismuth 0.1 grams.
(3) Penicillin, 7 mega units, given over 14 days.
(4) Ten weekly injections of Tryparsamide 3 grams, *combined with bismuth, 0.1 grams.*
(5) Oral potassium iodide and mercury for one month.
(6) Repeat course of penicillin.
(7) Ten weekly injections of bismuth 0 2 grams.
(8) Ten weekly injections of Tryparsamide, 3 grams, and bismuth, 0 2 grams.
(9) Oral potassium iodide and mercury for one month.

Courses 7 8 and 9 are repeated until treatment has been given for a period of 2 years Paralytic symptoms and signs clear rapidly but prolonged treatment and observation are required beyond this time. The cerebrospinal fluid is examined every 3 months and nearly always becomes normal in cell count and chemical tests. The Wassermann reaction becomes negative *in* only a minority *of* cases. If after 2 years treatment the cerebrospinal fluid is not normal in all respects except the Wasserman reaction, fever therapy is given followed by further courses of arsenic and bismuth until this result has been achieved.

Sometimes, *in* spite of *treatment* the cerebrospinal fluid

develops a paretic gold curve In such cases fever therapy is essential as for general paresis.

PARENCHYMATOUS LESIONS.

Tabes Dorsalis

Five per cent of untreated cases of syphilis develop tabes. The longer the incubation period the milder the disease. Infection of males predominate over females in the ratio of 10 to 1

The lesions are due to a fibroblastic infiltration of the posterior nerve roots where they enter the spinal cord with secondary degeneration of the nerve fibres originating in the cells of the posterior root ganglia. The posterior columns become grey and translucent due to the sclerosis and the pia-arachnoid becomes thickened over the dorsal portion of the cord.

The degeneration in the cord commences first in the lumbar region in the column of Goll. Lissauer's tract and other collaterals in the cord may also be affected and degenerate secondarily

In the arthropathies there is hyperplasia of the cartilage followed by destruction and osteophytic outgrowths. The synovial fluid is increased. Trauma plays a part in the production of the condition.

Three stages are often described in tabes

(1) Incipient or pre-ataxic,

(2) Ataxic,

(3) Paralytic,

but this division is an artificial one. Symptoms and signs can have been present for years without ataxia being present and these cases *cannot by any means be called* early cases. Any of the undermentioned symptoms and signs may be present first but usually the ones pointing to interference with the functions of the posterior nerve roots appear first. The onset is usually gradual and insidious but in a few cases it is rapid and marked ataxia is present after an onset commencing three months earlier Sensory symptoms appear first.

Lightning pains

One of the commonest symptoms often mistaken for rheumatism The pains are sharp and of short duration and careful inquiry elicits that the pains run across the limbs and not along their length as in rheumatism. The legs are affected more often than the arms and the pains do not affect the joints. The pains eventually cease from complete destruction of the posterior roots.

Paraesthesiae

Numbness and tingling occur A sensation of walking on cotton wool is very common.

Ocular symptoms

Usually the first to appear Dimness of vision occurs and progresses to total blindness in 3 to 4 years. *Diplopia* is often transient and is due to paralysis of the extra-ocular muscles Rarely total ophthalmoplegia results. Ptosis may be unilateral or bilateral.

Difficulty in walking

Due to loss of afferent impulses from the muscles, tendons and joints and commences in the lower limbs. The progress is slow and variable. Thus it may stop at the stage of slight inco-ordination or advance to an ataxic gait and finally to a paralytic stage so that there is inability to dress or feed

The same interruption of afferent impulses is responsible for difficulty in walking in the dark and inability to wash the face without knocking the head against the washtaps.

Sphincters

Often affected. There is delay and difficulty in micturition due to the loss of sensory impulses so that further distension of the bladder is necessary before the desire to micturate becomes evident. Later there is a danger of retention developing with consequent cystitis. Constipation is common. Impotence is usual.

Trophic lesions.

(1) A perforating ulcer under the great toe is the most constant The ulcer may penetrate to the bone

(2) Charcot's joints. There is a painless, rapid swelling of the joint, usually the knee. Only one joint is affected. A flail joint eventually develops.

(3) Brittleness of the bones.

Crises

Consist of paroxysms of pain in various organs. Characteristic of the early stage.

(1) Gastric
 Severe epigastric pain
 Repeated vomiting.
 Pallor sweating.
 Recovery rapid.

(2) Laryngeal Dyspnoea and noisy respiration develop May be fatal.

(3) Cardiac Attacks of angina pectoris.

(4) Rarely Intestinal, vesical and nasal crises develop

Early signs

Abnormal pupils
 Contraction to light slight or sluggish or poorly sustained.
 Inequality or irregularity of outline.

Loss of pain sensation over
 Nose
 Body from second rib to umbilicus,
 Ulnar borders of forearms
 Calves

Loss of ankle jerks.

Later signs.

Loss of deep pain sensibility Pressure on bones and tendo Achilles painless.

Impairment of muscle sense Patient cannot tell in what position a limb has been placed.

Loss of localisation of sensation.

Romberg's sign Difficulty in standing with feet together Intensified if eyes are closed.

Ataxic gait Foot raised higher than normal, t forwards and slapped down on to the ground.

Inco-ordination of movements.

Knee jerks lost.

Loss of bone vibration sense

External ocular palsies.

Hypotonia and paresis.

Charcot joints.

Blood Wassermann reaction positive in 70 per c early cases.

Cerebrospinal fluid

W.R. + in 90 per cent of cases.

Luetic gold curve.

Cells 80 + per cubic millimetre.

Globulin +

Diagnosis.

Argyll-Robertson pupil together with one symp diagnostic especially the presence of disturbances sation

Differentiate

Peripheral neuritis

The high stepping gait is different and is due to the leg high so that the toes may clear the ground. not ataxic. Lightning pains and eye signs are abse

Disseminated sclerosis

Inco-ordination and spastic paralysis occur but s pains and eye signs are absent.

Acute abdomen

In the visceral crises there is no rigidity and ther area of hyperaesthesia present.

Cerebellar disease

No lightning pains or sensory disturbances. Kn present. Headache vomiting and papilloedem present.

Course

Very variable. The condition may become stationary at any stage. Recovery never occurs but there may be improvement. In the paralytic stage death occurs from pyelonephritis, tuberculosis or pneumonia.

Treatment

General measures

(1) A tabetic should never be confined to bed since this always causes an increase in the ataxia. If confinement to bed is necessary for any reason massage exercises and re-education of muscle and joint sense are essential.

(2) Fraenkel's exercises are given under the supervision of a physiotherapist for the ataxia.

(3) Since bladder sensation is impaired the patient must be told to empty his bladder regularly every 4 hours during the day and before retiring at night.

(4) Aspirin and other analgesics are necessary for the lightning pains which may be increased at the beginning of specific treatment. The administration of ephedrine may abort an attack. Good results have been obtained from infiltrating the area of skin affected with proctocaine. Frequently morphine is required.

(5) Optic atrophy is progressive in 50 per cent of cases in spite of treatment. Where this is present the optic fields must be measured accurately and tryparsamide used very cautiously since this compound itself tends to cause optic atrophy.

(6) A change of occupation may be necessary because of ataxia or optic atrophy.

(7) Orthopedic measures are necessary for Charcot joints and pathological fractures.

Specific treatment

(1) Oral iodides and mercury for one month.

(2) Bismuth 0.2 grams for one month.

(3) Penicillin, 7 mega units given over a period of 14 days
(4) Oral iodides and mercury for one month.
(5) Four weekly injections of bismuth, 0.2 grams.
(6) Repeat course of penicillin.
(7) Weekly injections of Tryparsamide commencing with 1 gram per week for four injections. The visual fields are charted each week and if there is any diminution in the fields treatment with tryparsamide is stopped and acetylarsan used in its place. If there is no optic atrophy tryparsamide in 3-gram doses is then given weekly until 30 grams have been given.
(8) Oral iodides and mercury for one month.
(9) Ten weekly injections of bismuth, 0.2 grams.
(10) Ten weekly injections of tryparsamide combined with bismuth

The cerebrospinal fluid is examined every 6 months and treatment is continued with courses 8, 9 and 10 as long as improvement is occurring or for a minimum period of 2 years

Occasionally established cases of tabes are seen in whom the cerebrospinal fluid is completely normal. In such cases the disease seems to be burnt out. Two courses of bismuth alone are given not to affect the neurosyphilis, but to prevent the appearance of any other syphilitic manifestations.

GENERAL PARESIS.

Occurs in 3 per cent of syphilitics. Mainly men. Occurs between the ages of 35 and 45. A slow increasing dementia.

Pathology

There is a progressive degeneration of the cerebral cortex so that the convolutions become wasted, especially over the frontal and middle lobes. The sulci become widened. The atrophy affects the white matter predominantly. The ventricles are dilated and the fluid increased. The lining

ependyma is granular especially over the floor of the fourth ventricle. The pia-arachnoid is thickened and opaque. It is adherent to the underlying cortex and on removal brings part of the underlying cortex with it. The dura is thickened, vascular and adherent to the inner table of the skull. In addition there may be degeneration of the posterior columns of the spinal cord and the pyramidal tracts secondary to the changes in the cortex. The dementia is divided into 3 stages.

(1) *Prodromal condition.*

Mental manifestations

At this stage most complaints come from the relatives of the sufferer There is a little change in personality The patient becomes irritable and indulges in outbursts of temper Affections may change and a favourite daughter be frequently abused. There is a slow change in intellectual faculties and moral outlook. Business affairs are neglected and alcoholic and sexual excesses common. The memory is poor Fatigue is common after minimal physical or mental exertion. A man previously proud of his appearance becomes careless and his clothes are allowed to become creased and crumpled and stained with food and drink There are bitter complaints of severe headache, resembling migraine.

Physical manifestations

- Slurring speech.
- Tremor of tongue and lips.
- Slowness of speech.
- Mixing of syllables of words.
- Pupils—unequal.
  - Argyll-Robertson syndrome.
  - Ptosis.
- Temporary diplopia,
- Optic atrophy
- Absent deep reflexes.

(2) *Fully established disorder*

Mental

A condition of encroaching melancholia is the common one The patient is listless, sits about and vegetates. He shows no concern about meals or personal appearance. Habits degenerate.

Less frequently there develops an exalted state with grandiose delusions. The patient is continually planning and scheming Becomes wildly extravagant. Boasts of personal attainments and possessions. Restlessness and sleeplessness are marked.

Physical

Face immobile.

Tremors marked

Speech changes—at first there is difficulty in commencing with some trembling of the lips. Later the speech becomes blurred and there is difficulty in pronouncing linguals and dentals.

Writing—difficult because of the tremor and there is a tendency to leave out essential syllables and words. This is very characteristic.

Pupils—irregular unequal or sluggish.

Seizures are common—(i) Fainting fit or temporary loss of consciousness.
(ii) Apoplectic.
(iii) Epileptiform May succeed one another so rapidly that status epilepticus occurs.

The seizures are frequently followed by transient monoplegia or hemiplegia.

Gait unsteady—Difficulty in climbing stairs.
Tendency to trip over
Walk spastic or occasionally tabetic.

(3) *Terminal stage*

Stage of complete dementia. Patient helpless and bed ridden. Bladder and rectal symptoms develop Fat,

fatuous and filthy Death occurs from exhaustion or intercurrent infection

Blood.

Wassermann reaction positive in 100 per cent of cases.

Cerebrospinal fluid.

Wassermann reaction positive.

Colloidal gold curve 5555554433222.

Protein increased.

Cells, 100—200 per cubic millimetre.

Differential diagnosis

The diagnosis in the early stages is very difficult. The symptoms resemble those of other mental disorders. A Wassermann reaction should always be done and the cerebrospinal fluid examined in each case of mental disorder

Brain tumour

If in the frontal lobe simulates general paresis in rare cases. Symptoms of increased intracranial pressure are present and the syphilitic reactions are negative.

Disseminated sclerosis

Confusion arises because of the exalted mental state which is present in established cases. The symptoms and signs are usually characteristic and syphilitic reactions negative.

Mongolian idiocy

Characteristic appearance.

Prognosis.

Death within 5 years of beginning of terminal stage if untreated With treatment there is a reasonable chance of becoming well

TREATMENT

The shorter the duration of disease the better the response to treatment irrespective of the severity of the symptoms. Grandiose patients usually show more improvement

the melancholics. In juvenile general paresis the response to treatment is bad but further deterioration of intelligence can be prevented.

Treatment is started with ten weekly injections of bismuth 0·2 grams. This is then followed by a course of penicillin 7 mega units, given over a period of fourteen days. *This results in striking improvement in the patient's* general condition and by its use first more patients are able to have fever therapy than was possible before its introduction. If the general condition is still poor fever therapy is held in abeyance and 10 weekly injections of Tryparsamide are given. Courses of Tryparsamide and bismuth are then alternated until the general condition has improved.

Fever therapy should be given whenever possible since this form of treatment gives the best results. Two methods of treatment are available malaria inoculation and electropyrexia. Electropyrexia is safer than malaria inoculation and is more convenient since the pyrexia can be induced at any hour of any day. The exact degree of pyrexia and its duration are easily regulated and malaria inoculation sometimes fails. Contra indications to fever therapy are

Advanced age.
Marked malnutrition
Active pulmonary tuberculosis
Aortic aneurysm.
Uncompensated cardiac disease
Diabetes mellitus.

For malaria therapy a supply of blood infected with benign tertian malaria is obtained from the Ministry of Health Room 44v Whitehall S W 1. The blood, defibrinated or citrated comes in a sterile tube packed in a thermos flask containing ice and inoculation must be carried out within 24 hours of the specimen being collected. Two to 5 cubic centimetres of the blood may be injected intravenously or subcutaneously. The incubation period is 1 to 3 weeks. After the first rise of temperature blood smears are taken and examined for the malaria parasite. When

the temperature begins to rise it is recorded every half-hour until it is normal again. The temperature is allowed to rise to 105 F and, if the cardiac condition is satisfactory 15 rigors are allowed. Abundant supplies of fluid and glucose are given throughout the course of the fever and a watch kept on the blood pressure. A rapidly falling blood pressure is a warning of cardiac collapse developing and the fever must be terminated. The rigor is terminated by sponging and hot drinks and the malaria is terminated with quinine, grains x t.d.s. for two days.

For electropyrexia the inductotherm or Kettering hyper therm is used. In the inductotherm a high frequency current passed through a coil is used and the patient has to be placed in a special cabinet. In the Kettering hyper therm the patient s temperature is raised by the tempera ture and humidity of the air in the cabinet. The patient s temperature is taken every 30 minutes. One litre of saline is given intravenously before and during the fever session. Five hours fever treatment is given with a maximum temperature of 104—105 F maintained for 2½—3 hours once a week for 12 weeks. The fever session is discontinued if

The temperature rises above 106 F

Fall in blood pressure.

Collapse.

Muscle cramps.

Cerebral or pulmonary œdema.

Mental changes occur in one month. The patient becomes more alert and in touch with reality Habits improve and he can go home after two months and return to work in three months. Following fever therapy the scheme of treatment is

(1) Ten weekly injections of Tryparsamide, 3 grams, with bismuth, 0.2 grams.
(2) Ten weekly injections of bismuth 0 2 grams,
(3) Oral iodides and mercury for one month.

Two such courses are given each year for three years. If fever therapy cannot be given reliance is placed on such courses alone.

Chapter XII

SYPHILIS AND PREGNANCY

The great danger of syphilis during pregnancy is the production of an infant with the stigmata of congenital syphilis. Although such instances are rare they are all preventable. If a blood Wassermann test is performed on every pregnant woman at her first antenatal examination sufficient treatment can be given before delivery to prevent any disease in the foetus Infection of the foetus occurs by transplacental passage of the causative spirochaete via the lymphatics of the cord or by an embolus of spirochaetes carried by the veins of the cord. Infection seldom occurs earlier than the fifth month of pregnancy Pregnancy has an ameliorating effect on maternal syphilis and clinical manifestations of the disease are usually absent Serological reactions are therefore the only way of detecting these cases in practise. If the Wassermann reaction is positive in two tests during pregnancy treatment of the mother is imperative to prevent disease in the child Infection by the father by means of infected semen without infection of the mother does not occur

If the mother acquires syphilis late in pregnancy the child may escape intra-uterine infection but develop a typical primary sore after birth.

Congenital syphilis manifests itself in the majority of children within the first three months of life. Occasionally the manifestations are delayed until the age of 7 years or rarely until puberty Syphilis may produce the following manifestations during pregnancy

(1) Abortion.
(2) Miscarriage
(3) Premature birth.
(4) An infant born with signs (Florid syphilis)
(5) Infant born healthy and signs appear later
(6) Syphilis tarda

Congenital syphilis differs from the acquired disease in that there is no primary stage and the secondary and

tertiary stages are all mixed up together In consequence the manifestations are best dealt with in the different structures of the body

The following lesions may be present or develop

1 MARASMUS.

There may be no signs of syphilis present and yet the exposition of Pil. Hydrarg cum crete is followed by surprising gains in weight. In others obvious signs of syphilis are present as well as wasting

2. SKIN LESIONS.

Are not common just at birth but appear around the ages of 6 weeks to 2 months.

(i) *Maculo-papular rash*

This is the commonest skin lesion. The macules are most common on the

Mouth and chin
Neck,
Flexor aspects of arms,
Napkin area.

In the napkin area and other parts where there is irritation the macules often coalesce and scale profusely

(ii) *Erythematous rash*

Affects the napkin area and surrounding parts. Differentiated from intertrigo by the involvement of the depths of the skin folds.

(iii) *Rhagades.*

At margins where skin and mucous membranes meet fissures develop and leave scars which radiate out from the orifices.

(iv) *Bullous rash.*

Affects specially the palms and soles.

(v) *Condylomata*

Appear around 2 years of age. Are seen around the anus and scrotum and in the flexures where the skin is moist.

(vi) *Infiltrative lesions*

This is a deeper lesion usually accompanying the superficial lesions. There is a thickening of the skin which may

become wrinkled and assume a café-au-lait tint. The palms of the hands and soles of the feet become purple and glossy Later peeling occurs This infiltrative change is responsible for the "old man" appearance of an infant with congenital syphilis.

(vii) *Hair*

The eyebrows are lost and the hair over the back and sides of the head is also lost. In some cases the hair is more abundant and long and fine resembling fur This forms the so-called syphilitic wig but is present apart from congenital syphilis.

(viii) *Nails*

These become opaque and irregular They may be shed and the next nail is normal in appearance.

(3) Lesions of Mucous Membranes

Are nearly always present to some degree, especially in the nose

(i) *Nose*

A chronic nasal catarrh develops giving rise to a characteristic snuffle The amount of discharge is variable but contains the Treponema pallidum and is highly contagious.

In chronic nasal obstruction with inflammation over the turbinates and nasal septum the resulting negative pressure in the nose produces sinking of the nasal arch with the formation of a saddle nose

(ii) *Larynx*

The inflammation may be a simple catarrhal one or extend to extensive ulceration It gives rise to a characteristic hoarse cry and in some severe cases may produce suffocation In later life gummatous ulceration may produce respiratory obstruction and stridor

4. Bony Lesions

Appear aet. 6 to 12 months.

A—Skull

(i) Slight hydrocephaly and lipping of the fontanelles.

(ii) Cranio-tabes Softening develops in parts of the skull, especially behind the mastoid process.

(iii) Parrot's nodes. Bossing develops over the frontal and parietal bones.

(iv) Enlarged veins present over the scalp region.

(v) The palate may be perforated in childhood or later in adult life.

B—Long bones

(i) *Epiphysitis.*

An affection of the first few months of life appearing before the usual age for scurvy from which condition it must be differentiated. There is

Early loss of movement
Acute tenderness on movement. } Produce pseudo-paralysis.

Symmetrical lesions.
Upper limb involved more often than the lower limb
The bone is usually thickened at the epiphyseal line.
Definite separation of the epiphysis may occur followed by secondary infection of the joint.

(ii) *Dactylitis*

Occurs about the second year of life. The proximal phalanges of two or more digits are involved and fingers are affected more often than toes. The swelling is fusiform and untreated, breaks down and discharges.

(iii) *Periostitis*

Appears around the sixth year of life. The tibia is the bone usually affected. In one form a sabre tibia results with the bone thickened from before backwards and curved with its convexity looking forwards. The subcutaneous border loses its sharp edge. In the other form the tibia becomes cone-shaped with the apex of the cone at the lower end.

(iv) *Osteomyelitis*

The patient complains of aching pain in the long bones which enlarge and are tender to pressure. The bone is smooth and suppuration rarely occurs. The condition has to be differentiated from a sarcoma.

Localised osteitis occurs in the clavicle, sternum and ribs and produces a localised swelling

(v) *Joints*

Three types of disease occur

(a) Suppurative arthritis resulting from epiphysitis and separation of the epiphysis.

(b) Around the age of ten years a bilateral chronic synovitis occurs with effusion (Clutton's joints) There is an insidious onset with little pain so that movement of the joint is not limited

(c) Osteoarthritis with osteophytic formation appears around the age of 18 years There is limitation of movement and the cartilage *may* be eroded and the underlying bone also attacked.

(vi) *Permanent teeth*

Only the permanent teeth are affected. The incisors are notched and the pre-molars are dome-shaped.

5. VISCERAL LESIONS

(i) *Liver*

Becomes enlarged either from diffuse interstitial hepatitis or from definite gummata Jaundice and ascites may develop.

(ii) *Spleen*

Becomes palpable Definite gummata are rare.

(iii) *Kidneys*

Parenchymatous nephritis or interstitial fibrosis may develop Paroxysmal hæmoglobinuria is commonly syphilitic in origin

(iv) *Orchitis*

Is easily overlooked since it is painless. The enlargement may be diffuse or circumscribed Is often a sign of relapse from insufficient treatment Syphilis is practically the only cause of enlargement of the testes under the age of 6 months.

(v) *Pseudo-leukæmia infantum*

Although the white blood cells are increased in number no immature cells are found in smears.

6. LESIONS OF THE NERVOUS SYSTEM

(i) *Interstitial keratitis*

Appears between 7 and 9 years of age. The cornea becomes opaque in patches the opacity spreading from the margin to the centre The inflammation may spread to the other eye. The cornea becomes vascularised and assumes a pinkish hue. Weakening of the cornea may follow with bulging forward from the pressure inside the globe Treatment never produces a completely clear cornea.

(ii) *Bilateral deafness*

Occurs rapidly without preceding symptoms. Is commoner in the female.

(iii) Juvenile tabes is very rare

(iv) Juvenile general paresis is fairly common around the age of 10 to 12.

When a child is born with signs confirmation of the diagnosis can be obtained by examination of the placenta. This is heavier than normal and greasy in appearance. Infarcts are common. Microscopically the typical vascular and peri-vascular changes of syphilis are seen. Serological tests can be performed on the cord blood or venous blood and dark ground examination of scrapings from a portion of the umbilical cord may show the Treponema pallidum

Between the second and third week of life radiological examination of the long bones shows periostitis and broadening and irregularity of the epiphyseal line.

In late childhood and adolescence diagnosis is not easy and congenital syphilis must always be borne in mind when an obscure lesion is met with. The mother's child-bearing history is helpful and the stigmata of earlier congenital syphilis. The commonest stigmata are

Teeth—(i) Notching of the incisors.
(ii) Doming of the pre-molars.

Tibia—Thickened and curved.

Face—Radiating scars at corners of the mouth.

Eyes—(i) Corneal opacities.
(ii) Synechia from previous iritis.

Nose—Saddle shaped.
Ears—Absolute deafness.
The Wassermann reaction may be positive but it tends to die out after puberty

TREATMENT

(1) *During pregnancy*

A woman who has had syphilis should not have children until 2 years have elapsed after treatment. Even then a course of 10 injections of arsenic and bismuth is essential during pregnancy to ensure the birth of a healthy child.

Syphilitics found when pregnant are usually diagnosed about the third month of their pregnancy Seven mega units of penicillin are given followed by 10 weekly injections of neo-arsphenamine, 0.45 grams and bismuth 0.2 grams and then bismuth alone, the injections being stopped 4 weeks before delivery After delivery a further course of arsenic and bismuth combined and then bismuth alone are given Further surveillance is then as for cases of latent syphilis.

(2) *Treatment of the baby*

(a) Those with signs.

Penicillin is not given immediately since there is a likelihood of acute exacerbation of symptoms especially catarrhal and infants tend to drown in their own secretions.

(1) Commence with Pil. Hydrarg cum crete grains 1 t d.s. for 4 weeks with the addition of pulv Ipecac. cum. opio grains 1/12 if this causes diarrhœa
(2) Follow with penicillin The dose is 100,000 units per kilogram body weight, given intramuscularly divided into three-hourly doses and spread over 7½ days.
(3) Sulpharsphenamine .01 gram per kilogram body weight and .004 grams bismuth metal per kilo weekly for 10 weeks Alternatively bismuth can be given intramuscularly and stovarsol orally The dose of stovarsol is

aet 2 weks. Quarter tablet of 25 grams daily
aet. 8 weeks Half tablet daily

(4) Ten weekly injections of bismuth alone.

(5) After 4 weeks interval repeat the course of arsenic combined with bismuth and then bismuth alone.

(b) Latent congenital syphilis.

The object of treatment is to prevent the future development of active lesions of which interstitial keratitis and deafness are the most frequent. These usually appear before the age of 15 years but their development may be delayed into the late twenties. There is a poor prospect of reversing the Wassermann reaction This usually only occurs in 40 per cent of cases.

Scheme of treatment

(1) A course of penicillin in the doses detailed above. A harmless Herxheimer reaction consisting of elevation of temperature is common.

(2) Three courses of arsenic combined with bismuth and bismuth alone are given with one month s rest between each course.

The persistence of a positive Wassermann is of no significance in the male In the female a further course of arsenic and bismuth should be given during pregnancy although no case of third generation syphilis has been reported in which the mother had received even minimal treatment.

(c) *Late congenital syphilis.*

The response to all forms of treatment is poor Interstitial keratitis and juvenile general paresis are especially refractory

Scheme of treatment

(1) Penicillin 100,000 units per kilo body weight.

(2) Acetylarsan 3 ccs. and bismuth for 10 weeks.

(3) Bismuth alone for 10 weeks.

(4) After one month s rest continue with arsenic and bismuth

A minimum of 2 years treatment is required.

CHAPTER XIII.

OTHER VENEREAL INFECTIONS

Chancroid.

A venereal disease affecting men and women. In this country it is usually encountered in the ports. Due to infection with Ducrey's bacillus which is a minute Gram negative rod usually found extra-cellularly in groups or chains. The infection is commoner in men since the acid vaginal secretion inhibits growth of this organism.

Within 24 hours of infection a red papule appears on the genitalia becomes vesicular and then pustular Finally a clear-cut ulcer develops which spreads fairly quickly and, if secondary infection occurs, causes extensive destruction of the genitalia. The ulcer is irregular with undermined edges and a soft irregular base. Autoinoculation of neighbouring parts is common. The draining lymph glands rapidly become infected and swollen. The infection is self limited in non-infected cases and the sore heals in 3 weeks.

Dark ground examination of the exudate is important to exclude the presence of T pallidum. The diagnosis is confirmed by the detection of Ducrey's bacillus in smears.

Treatment

The sore is kept clean with saline dressings and the exudate examined daily for T pallidum Sulpha drugs are given by mouth starting with 2 grams followed by 1 gram four times a day for five days. Such treatment does not interfere with the detection of T pallidum.

If suppuration has occurred in the inguinal glands the abscess is aspirated daily and the cavity washed out with 2 per cent mercurochrome. If rupture of the abscess has already occurred the area is widely incised and the cavity packed with gauze soaked in BIPP The blood is tested each month for 3 months to exclude concomitant syphilitic infection.

Non-Specific Urethritis

Due to a virus infection. May be acquired from swimming baths. Causes very little disability and urethral discharge is the only symptom. Organisms cannot be found

in direct smears or on culture. The discharge responds to injections of neo-arsphenamine intravenously repeated twice weekly for 6 injections.

Trichomonas infection

This is a venereal infection in most cases and is frequently associated with gonorrhoea. A history of sexual intercourse, usually from 3 to 15 days prior to the onset of symptoms can usually be obtained. For a long time Trichomonas vaginalis was regarded as an incidental saprophyte of no pathological significance but it is now recognised to be a frequent cause of a vaginal discharge and search for the causative trichomonad is imperative in all cases where gonorrhoea is ruled out. Infection after the menopause is rare.

Pre-disposing factors are

- Lowering of the pH of the vaginal secretion by infection with the gonococcus, B. coli and streptococci.
- Trauma
- Uncleanliness.
- Presence of cervical erosions.
- General debility after illness.

The normal pH of the vaginal secretion is 3.8 to 4 due to the presence of Doderlein's bacillus and lowering of the acidity to a pH between 5 and 6 seems to be necessary before the trichomonas becomes pathogenic.

The infection causes itching and burning of the external genitalia. Vaginal discharge is profuse. Dull and aching pain in the lower abdomen is common. Sometimes bladder symptoms are present suggesting urethritis or trigonitis and in severe cases dyspareunia, spasm of the vulva and a feeling of discomfort in the vagina are present.

On examination the discharge is greyish yellow, thin, frothy and with a musty odour. The vaginal mucosa is inflamed. Desquamation gives rise to characteristic "straw-berry" spots which bleed on instrumentation. The diagnosis is confirmed by the detection of the causal trichomonad in fresh smears or hanging drop preparations using dark ground illumination. Confirmation of doubtful infestation can be obtained by culture of the organism. Specimens

for these investigations are obtained from the posterior fornix with a long tapering glass tube and rubber suction bulb

Trichomonas vaginalis is 16—18 μ. long and may be either round or oval. It has an undulating membrane *about half the length of its body with 4 anterior flagellae.* There is a large oval nucleus. The organism is recognised in a hanging drop preparation by its jerky movements of partial rotation T vaginalis can be stained in smears

(1) Before drying the smear it is held over the mouth of a bottle containing 2 per cent osmic acid.
(2) Dry without the help of heat.
(3) Fix in pure methyl alcohol for 10 minutes.
(4) Dry in air
(5) Pour on Giemsa stain and leave 1 hour
(6) Wash in tap water and dry

TREATMENT

(1) The vagina is mopped dry
(2) The whole vagina is heavily insufflated with Pleragol powder (Wyeth)
(3) The patient inserts one picragol pessary as high as possible into the vagina each night for 6 nights after thorough washing of the hands. The pessary is best inserted lying down and the upright position should not be resumed until next morning A diaper should be worn to prevent staining of the night clothes.
(4) The insufflation is then repeated and also another course of 6 pessaries inserted into the vagina
(5) The insertion of pessaries is continued each night during the next three menstrual periods.

If remissions occur picragol should be replaced by Acetarsol vaginal compound tablets which are inserted at night high up in the vagina after retiring The next morning douching with a solution of vinegar one drachm to one pint of warm water is carried out. This is done each day for one week and then on alternate days for two more weeks. Persistence of infection may be due to the presence of undiagnosed gonorrheal infection Consequently if a further course of

treatment is needed this should be combined with a sulphonamide compound by mouth.

Male.

In the male a generalized balano-posthitis develops with infestation of the anterior urethra. Symptoms are urethral discharge, frequency and dysuria.

Treatment.

The balano-posthitis clears with local cleanliness. The urethritis clears when the urine is made strongly alkaline with sodium citrate, grains 40 q.i.d. and kept alkaline for 14 days. If necessary an emulsion of picragol can be instilled into the urethra. Relapse commonly follows excessive consumption of alcohol.

Genital Warts.

Occur in both males and females.

Associated with Gonorrhoea,
Trichomonas infestation,
Local irritation

The warts are due to the same virus which causes warts elsewhere in the body. Found on the glans penis coronal sulcus and inner aspect of the prepuce in males. In females they are limited to the vulva.

In the early stages cleansing and drying with dusting powder is sufficient. Later apply trichloroacetic acid after the crystals have deliquesced on exposure to air or a 25 per cent oily suspension of podophyllin. When extensive areas are involved x-ray therapy is required.

Lymphogranuloma Inguinale

A virus disease with an incubation period of a few days. A small herpetiform ulcer then appears on the glans penis or the vulva. One to three weeks later enlargement of the inguinal glands occurs accompanied by fever and leucocytosis. Later the glands become matted together fluctuation occurs, the skin becomes adherent to the inflammatory mass and multiple sinuses form.

Elephantiasis of the lower limb and of the vulva may follow the lymphatic obstruction and fibrosis especially if a mass of enlarged glands has been removed.

The diagnosis is confirmed by Frei's test. An intracutaneous injection of 0·1 cubic centimetre is followed 48 hours later by an inflammatory area ½ centimetre in diameter with a central zone of necrosis.

Treatment

Rest in bed.

Simple diet.

Specific

(1) Many early cases respond to the sulpha drugs.

(2) Intravenous injections of 2 per cent sodium antimony tartrate every fourth day starting with ½ grain the dose being increased slowly to 2½ grains. A total of 30 grains is given.

Non-specific

(1) If suppuration is present, incision with free drainage is necessary Sinuses are packed with sulphonamide powder

(2) Protein shock induced by the intravenous injection of T.A.B vaccine every third day starting with 100 million organisms and increasing to 500 million organisms

Inguinal Ulcerative Granuloma

A rare form of chronic ulceration seen in the tropics and resulting from sexual intercourse The ulceration affects the inguinal region and spreads to neighbouring parts by autoinoculation Aetiology is unknown.

The first lesion is a papule on the glans penis or labia minora which grows into a superficial ulcer This extends slowly and affects the moist parts of the groin and perineum There is a thin discharge Healing in one part is accompanied by destruction in another The disease may last for years Biopsy may be necessary to exclude epithelioma

Treatment

(1) Excise whole area in early cases.

(2) Antimony as for lymphogranuloma inguinale

CHAPTER XIV

THE PREVENTION OF VENEREAL DISEASES

The question of the prevention of venereal diseases is a large one involving moral considerations as well as medical aspects. A great number of those infected are cured but in many cases the signs of infection are either slight or are ignored by the sufferers. A large number of these latter cases are permanently damaged and their life shortened. In addition a husband may be unaware that he has contracted syphilis and may unwittingly infect his wife who carries the additional danger of producing an infant with congenital syphilis. Many women have desired children and had frequent abortions only for a positive serological result to be discovered eventually. These cases are great tragedies and the discovery of the infection does not help the stability of the marriage. The prevention of infection is also made more difficult by the fact that the diseases can be transmitted not only by those who are suffering from the disease but also by those incubating the disease.

Many of those who have been treated and show no active signs of disease often have a continual fear of a recurrence and this fear may develop into a mental obsession.

Efforts to discourage promiscuity have little chance of success and separation of husband and wife due to housing shortages is a factor in promoting promiscuity. In the services during the war the incidence of venereal diseases in a unit rose rapidly after one year's service overseas.

An attempt has been made to reduce the number of infectious cases. The majority of these are women with easy morals. In a great number of these women the signs of infection are slight and are ignored. Defence Regulation 33B was designed to bring these people under treatment at least until they were no longer infectious.

In addition individual prophylaxis after exposure can materially reduce the possibility of disease occurring. These measures frequently fail because the person involved is drunk at the time of exposure and prophylaxis is

out the next morning If possible prophylaxis should be performed within an hour of exposure or at least within 4 hours of exposure.

Individual prophylaxis

Male

(1) The wearing of a condom gives efficient protection to the penis but the pubes and lower abdomen are not protected. They cannot, therefore be relied upon as the sole measure of prophylaxis.
(2) Wash the genitalia perineum and lower abdomen with soap and water
(3) Spread on a 20 per cent calomel ointment.
(4) Instil into the urethra 10 cubic centimetres of 5 per cent mild silver proteinate B.P C This is retained in the urethra for 5 minutes by holding the glans penis. The bladder should not be emptied for several hours after this.

Female

Prophylaxis is more difficult for the female since she can rarely disinfect the urethra herself

(1) Wash vulva, perineum and lower abdomen with soap and water
(2) Douche with 1 500 Dettol solution
(3) Rub calomel ointment on pubes vulva and introitus vaginæ.
(4) If possible introduce 10 per cent mild silver proteinate into the cervical canal with a probe and instil 5 per cent solution into the urethra.

If prophylactic treatment is carried out by a doctor the patient should return for examination one week later and again after 3 months when a blood test should be performed to exclude syphilis.

The practice of giving small doses of sulphonamides as a prophylactic measure is to be deprecated This commonly results in drug resistant bacteria persisting and makes later eradication of the infection more difficult. With penicillin the danger is greater since a syphilitic infection may be masked and no evidence of it discovered until months later

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